LAMBDA XLS/XLS+

User's Guide

PerkinElmer®
precisely.

Release History

Part Number	Release	Publication Date
L6050017	A	April 2008

Any comments about the documentation for this product should be addressed to:

User Assistance
PerkinElmer Ltd
Chalfont Road
Seer Green
Beaconsfield
BUCKS
HP9 2FX
United Kingdom

Or emailed to: info@perkinelmer.com

Notices
The information contained in this document is subject to change without notice.
Except as specifically set forth in its terms and conditions of sale, PerkinElmer makes no warranty of any kind with regard to this document, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.
PerkinElmer shall not be liable for errors contained herein for incidental consequential damages in connection with furnishing, performance or use of this material.

Copyright Information
This document contains proprietary information that is protected by copyright.
All rights are reserved. No part of this publication may be reproduced in any form whatsoever or translated into any language without the prior, written permission of PerkinElmer, Inc.

Copyright © 2008 PerkinElmer, Inc.

Trademarks
Registered names, trademarks, etc. used in this document, even when not specifically marked as such, are protected by law.

PerkinElmer is a registered trademark of PerkinElmer, Inc.

Table of Contents

Introduction 5
About this Manual 6
Conventions Used in this Manual 7
    Notes, cautions and warnings 7
Safety Information 9
General Safety 10
    Decontamination Certificates 11
    Chemicals 11
    Toxic Fumes 11
    Waste Disposal 11
    Personal Protective Equipment 11
    Intended User 12
Unpacking and Installation 13
Installing your Instrument 15
Unpacking 16
Connecting to the Line Power Supply 17
Using your Instrument 19
Overview of the Instrument 20
Switching on the Instrument 22
Using the Software 23
Methods and Favorites 26
    Folder Options 26
    Method Options 28
Lambda XLS/XLS+ Instrument Methods 30
Utilities 31
    Date and Time 32
    Regional 32
    Printer 33
    Preferences 34
    Contrast 34
    About 35
Sample Handling 36
Instrument Methods 37
Single Wavelength 38
Multi Wavelength 41
Spectrum 44
Concentration 49
Standard Curve 54
Kinetics 60
Absorbance Ratio 65
Accessories 69
Accessories and Consumables 70
Printer Installation and Configuration 71
    Printer installation 71
    Printer configuration 72
    Loading or changing the printer paper 73
Bluetooth Accessory Installation 74
Lambda Bio/XLS Print Utility 77
Maintenance 79
General Maintenance 80
    Cleaning the instrument 80
Storage and Shipping 82

Appendices.....83
Appendix 1: Specifications.....84
Appendix 2: Customer Care Contacts.....85
Index.....86

Introduction

About this Manual

This user's guide describes the installation and operating procedures for your Lambda XLS/XLS+ UV/Vis spectrometer.

The manual contains the following sections:

- Introduction;
- Safety Information;
- Installing your Instrument;
- Using your Instrument;
- Instrument Methods;
- Accessories;
- Maintenance;
- Appendices.

Conventions Used in this Manual

Normal text is used to provide information and instructions.

Bold text refers to text that is displayed on the screen.

UPPERCASE text, for example ENTER or ALT, refers to keys on the PC keyboard. The symbol "+" is used to show that you have to press two keys at the same time, for example, ALT+F.

All eight digit numbers are PerkinElmer part numbers unless stated otherwise.

Unless stated otherwise, in this manual "instrument" refers to the Lambda XLS or Lambda XLS+ instrument.

Notes, cautions and warnings

Three terms, in the following standard formats, are also used to highlight special circumstances and warnings.

NOTE: A note indicates additional, significant information that is provided with some procedures.

WARNING

*We use the term WARNING to inform you about situations that could result in **personal injury** to yourself or other persons. Details about these circumstances are in a box like this one.*

CAUTION

*We use the term CAUTION to inform you about situations that could result in **serious damage to the instrument** or other equipment. Details about these circumstances are in a box like this one.*

Safety Information

General Safety

The Lambda Bio/XLS instruments conform to the requirements of the Low Voltage Directive 2006/95/EC, EMC Directive 2004/108/EC and the IVD Directive 98/79/EC.

Standards to which conformity is declared:

- EN 61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use.
- EN 61010-2-101 Particular requirements for IVD medical equipment.
- BS EN 591 Instruction for use for in vitro diagnostic instruments for professional use.
- BS EN 13612 Performance evaluation of in vitro diagnostic medical devices.
- EN 61326-2.3 Electromagnetic compatibility – generic emission standard Electrical equipment for measurement, control and laboratory use.
- EN 61326 (+A1/A2/A3) Electromagnetic compatibility – generic emission standard Electrical equipment for measurement, control and laboratory use. Classified as Class B for conducted and radiated emissions.

This appliance is marked according to the European directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE). See the *Lambda Bio/XLS Safety Manual* (L6050014) for more information.

There are a number of warning labels and symbols on your instrument. These are there to inform you where potential danger exists or particular caution is required. Before commencing installation, please take time to familiarize yourself with these symbols and their meaning.

This instrument is subject to the following hazards:

The UV source contained within the unit generates a light beam that traverses the sample chamber during sample measurements. Under normal use, this beam is contained within the unit and no UV radiation is emitted from the system. However, care should be taken that no reflective items are placed in the beam during sample measurements so that the beam is reflected out of the system. Prolonged exposure to the beam may cause permanent eye damage. Identical constraints apply if the sample holder is removed from the unit for cleaning – this should only be done with the power disconnected from the instrument.

- High voltages exist inside the unit. Repair and maintenance should only be carried out by individuals trained specifically to work on these instruments.

There are no bio-hazardous materials within the unit; however, this unit could be used with bio-hazardous samples. Given the general purpose nature of these instruments and the wide variety of uses to which it can be put, it is not possible to define exact decontamination procedures for the many types of samples being tested. These should be established by the user, or their Health and Safety representative, before use of the instrument. Guidance can be found in document M29-A3 Protection of Laboratory Workers from Occupationally Acquired Infections: Approved Guidelines *published by the US Clinical and Laboratory Standards Institute. The sample compartment may be removed and cleaned by soaking in an appropriate disinfectant to the bio-hazard that has occurred, for at least 30 minutes. The compartment should then be rinsed in distilled water and allowed to dry. Similarly, the unit exterior can be wiped over with an appropriate disinfectant with a wipe or soft cloth. Any internal spills should be wiped up with absorbent material through the sample compartment aperture and similarly decontaminated using disinfectant soaked wipes.*

Decontamination Certificates

If the instrument needs to be returned, a decontamination certificate is required. Decontamination certificates can be found at the following web address or be provided by Customer Care.

http://www.perkinelmer.com

It is the responsibility of the user to ensure a safe working environment is provided to the engineer or staff by appropriate risk assessments and, if appropriate, decontamination procedures before work commences.

Chemicals

Use, store, and dispose of chemicals that you require for your analyses in accordance with the manufacturer's recommendations and local safety regulations.

Toxic Fumes

If you are working with volatile solvents or toxic substances, then you must provide an efficient laboratory ventilation system to remove vapors that may be produced when you are performing analyses.

Waste Disposal

Waste containers may contain corrosive or organic solutions and small amounts of the substances that were analyzed. If these materials are toxic, you may have to treat the collected effluent as hazardous waste. Refer to your local safety regulations for proper disposal procedures.

Personal Protective Equipment

No Personal Protective Equipment (PPE) is required for operation of the equipment, although the samples under test may require the use of such PPE and should be covered by a risk assessment made by the user or the appropriative Health and Safety representative.

Intended User

This instrument is intended for use by individuals trained in and familiar with the use of spectrophotometers and their associated hazards as detailed above. In the event of a malfunction or hazard occurring, the user responsible shall disconnect the unit from power, and isolate the instrument for decontamination by an appropriate means if biohazardous material is spilled on, in or around the instrument.

Unpacking and Installation

- This equipment is designed to be installed in accordance with the Canadian Electrical Code (CEC) Part 1, CSA C22.1 and CSA C22.2 No. 0.
- Inspect the instrument for any signs of damage caused in transit. If any damage is discovered, access the Troubleshooting Guide on the PerkinElmer website http://www.perkinelmer.com and follow the process there. If you do not have access to the website, contact Customer Care (see *Appendix 2: Customer Care Contacts* on page 85).
- Ensure your proposed installation site conforms to the environmental conditions for safe operation:

  Indoor use only.

  Temperature range 5 °C to 35 °C.

  Maximum relative humidity of 80% up to 31 °C, decreasing linearly to 50% at 40 °C.

NOTE: If you use the instrument in a room subjected to extremes of temperature change during the day, it may be necessary to recalibrate (by switching off and then on again) once thermal equilibrium has been established (2–3 hours).

- If the instrument has just been unpacked or has been stored in a cold environment, it should be allowed to come to thermal equilibrium for 2–3 hours in the laboratory before turning the instrument on. This will prevent calibration failure as a result of internal condensation.
- The instrument must be placed on a stable, level bench or table that can take its weight (approximately 4.5 kg) with enough space around the instrument so that air can circulate freely.
- This equipment must be connected to the supply outlet with the power cord and power supply provided. It can be used on 100–240 V, 50–60 Hz supplies. The power cord or power supply outlet should be is fused at 3 A, 250 V.
- The instrument should be positioned so that the power cable can be readily disconnected from the unit in the event of a hazard or malfunction occurring.
- Site the instrument in an atmosphere free from dust and corrosive fumes.
- Please read through the instrument User's Guide supplied on the Lambda Bio/XLS Documentation CD (L6050018) prior to use.
- Switch on the instrument via the ON/OFF button on the keypad after it has been plugged in. The instrument will perform a series of self-diagnostic checks.

WARNING

If the equipment is used in a manner not specified herein, then the protection provided by the equipment may be impaired and instrument warranty withdrawn.

Installing your Instrument

Unpacking

CAUTION	*Take great care when installing your instrument, and follow the procedures described in this manual.*

1. Check that you have the items listed in the following table.

Part Number	Description
L7110189/L7110192	Lambda XLS/XLS+(if applicable)
L7110190/L7110193	Lambda XLS/XLS+ with printer (if applicable)
L7110191/L7110194	Lambda XLS/XLS+ with SD (if applicable)
L6050014	Lambda Bio/XLS Safety Manual
L6050018	Lambda Bio/XLS Documentation CD
L7111025	Cuvette dust cover
L7110231	Lambda Bio/XLS Print Utility and Cable (if applicable)
N/A	Power cable

2. Examine the components for any signs of damage in shipment:

    - Check the enclosure of the instrument for damage, and make sure that the terminals are not damaged.
    - Make sure that the compartment is free of dust or other foreign matter.

NOTE: In the event of damage, or missing parts, access the Troubleshooting Guide on the PerkinElmer website http://www.perkinelmer.com and follow the process there. If you do not have access to the website, contact Customer Care (see *Appendix 2: Customer Care Contacts* on page 85).

Connecting to the Line Power Supply

WARNING

Electrical Hazard

To prevent potential injury to yourself and damage to the instrument, make any electrical connections in the system before connecting to the line power supply.

The instrument automatically adjusts to the correct operating voltage.

- Connect to the supply outlet with power supply provided and the power cord that is appropriate for your region.

  You must use the power cord and power supply supplied with the instrument.

NOTE: If the instrument has just been unpacked or has been stored in a cold environment, it should be allowed to come to thermal equilibrium for 2–3 hours in the laboratory before turning the instrument on. This will prevent calibration failure as a result of internal condensation.

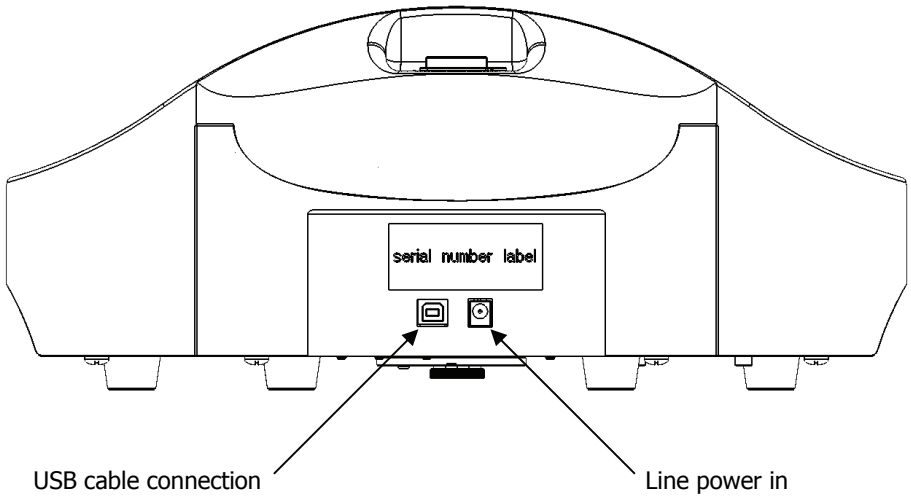


Figure 1 Rear connections on the Lambda Bio/XLS instrument

The ON/OFF switch is located at the top left-hand of the keypad panel.

Using your Instrument

Overview of the Instrument

The Lambda XLS/XLS+ instrument is a simple-to-use UV/Visible spectrometer with a CCD array detector (1024 pixels).

To access the folders and functions on your Lambda XLS/XLS+ instrument, navigate around the display using the alphanumeric keys and the navigation arrows on the keypad.

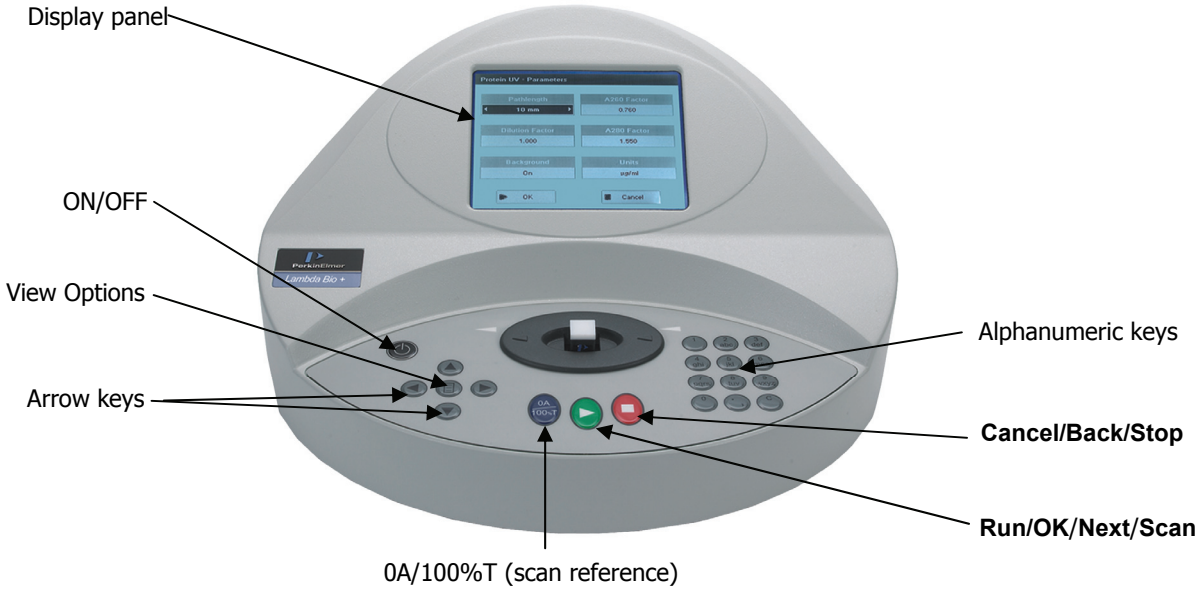


Figure 2 Keypad and display

Key	Action
Display panel	Displays folders, menu options that guide you through taking measurements and viewing your results.
	Turns the instrument on/off.
	Use the four arrows to navigate around the display and select the required setting from the active (highlighted) option.
	The Options key displays the options for that method. See *Options* on page 25 for more information. Options unique to a specific method are described in the relevant section.
	The 0A/100%T key sets a reference solution measurement to 0.000 A or 100%T at the current wavelength. When in scan mode, it performs a reference scan.
	The Cancel/Back/Stop key Cancels a selection and returns to the previous folder, goes Back to previous screen in a method or Stops a measurement.

	The **OK**/**Next/Run/Scan** key, enters or confirms a selection, moves to the Next screen or takes a measurement.
Alphanumeric keys	Use these to enter Method Settings, make Options menu selections and to write text descriptions, where appropriate. Use repeated presses to cycle through lower case, number and upper case. Leave for 1 second before entering the next character. Use the key to backspace. Press 1 to enter a space.

Switching on the Instrument

NOTE: If the instrument has just been unpacked or has been stored in a cold environment, it should be allowed to come to thermal equilibrium for 2–3 hours in the laboratory before being switched on. This will prevent calibration failure as a result of internal condensation.

CAUTION

Do not turn power to the instrument on and off quickly as this may damage the power supply.

Wait at least 30 seconds before restarting the instrument.

- Switch on the instrument via the ON/OFF on the keypad, as shown in Figure 2.
  The instrument will perform a series of diagnostic checks.
  After switch on and calibration, the default home page is displayed.

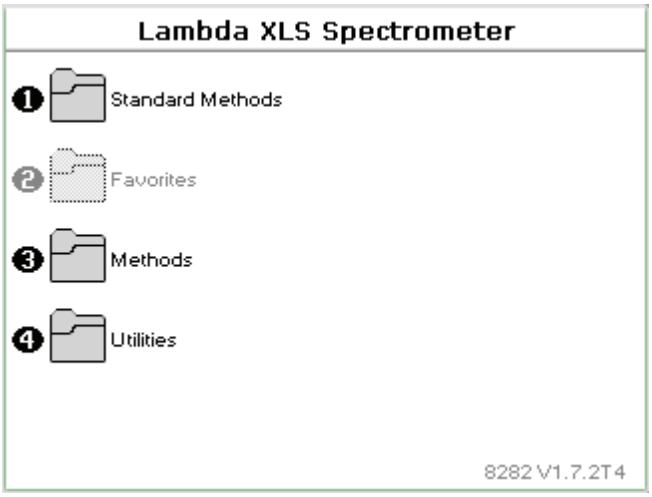


Figure 3 Lambda XLS home page

NOTE: If during the calibration the instrument displays an error message it will prompt you to press **OK** to restart the calibration procedure. However, after three attempts you will still be able to view the default home page. You should **NOT** use the instrument under these circumstances. Instead, make a note of the error message and refer to the Troubleshooting Guide on the PerkinElmer website to address the problem.

Using the Software

The home page contains a list of folders and functions or methods. Each item in the list is numbered and is opened by using the associated number on the keypad. Opening a folder takes you to another screen of further options. Opening a method takes you to a Method Settings screen where you can set the required parameters before using the method to take measurements.

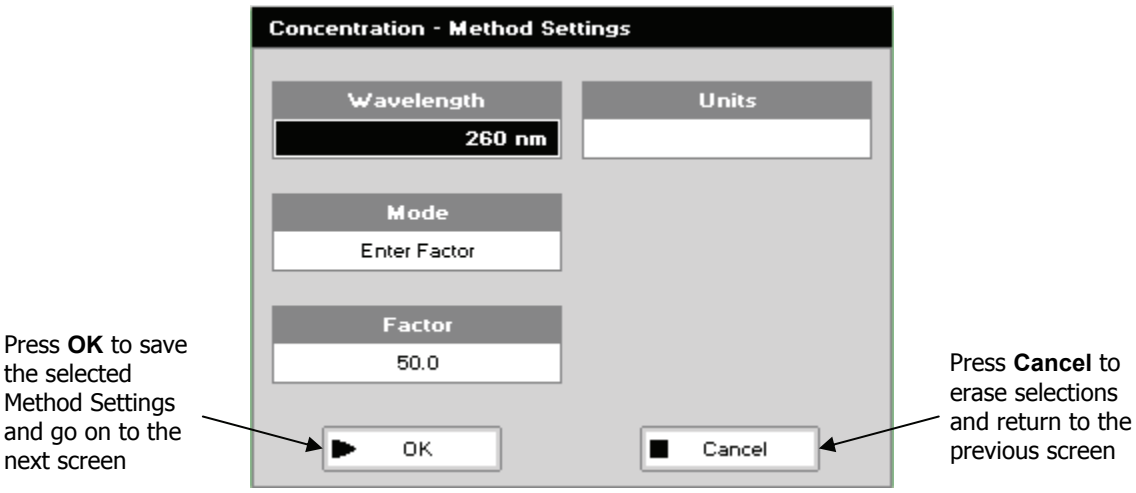


Figure 4 Features of a typical Method Settings screen

Navigation

- Move between settings using the up and down arrows.

Entering Method Settings

- Enter Method Settings by using the keypad numbers.

  OR

  If the box contains the symbol ☒, either type in a value or press options , and choose an option from the next screen.

  OR

  If the box contains arrow symbols, use the left and right arrows to select the required setting.

Taking measurements

After the method settings have been entered, press **OK** to start measurements. The results screen for the method is displayed.

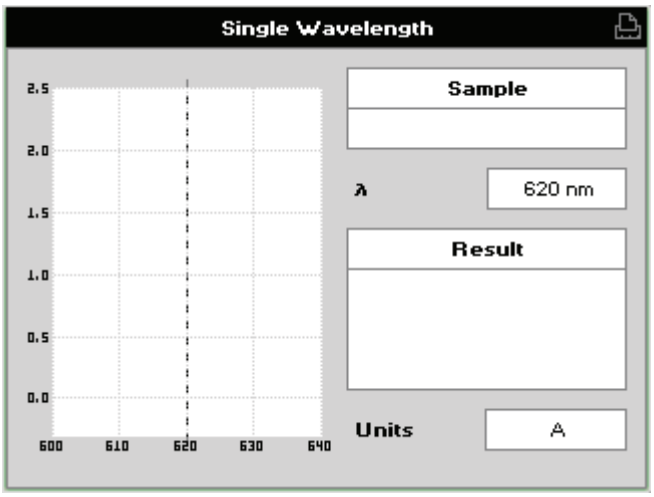


Figure 5 A typical results screen

1. Insert the Reference sample in the sample holder, and press OA/100%T to take the reference measurement.
2. Insert your first sample and press .
3. Repeat Step 2 for each sample.

Results

The results are displayed on screen.

Results shown as ---- indicate that the concentration is out of range, for example, if a negative absorbance value is obtained.

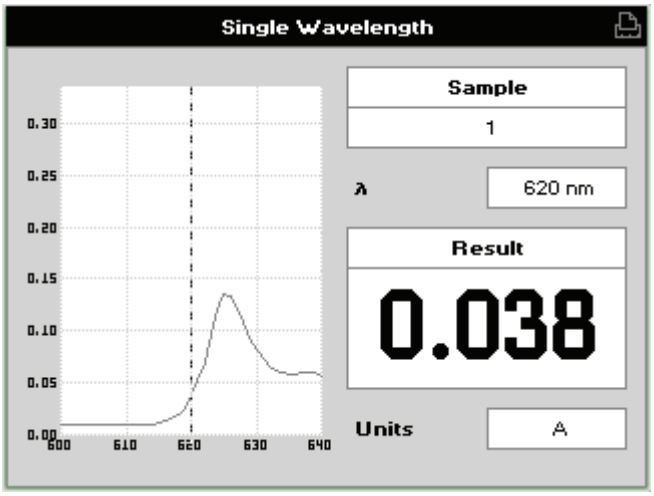


Figure 6 The Single Wavelength method results screen

Options

Within each method you are able to select various options that define the way results are treated. These options may be specific to the method, allow you to print the results or view method settings. If you are not using a previously stored method, it is advisable to check that these options have been appropriately set for your experiment before running your samples.

NOTE: Setting the **History** method setting to **On** (see *Preferences* on page 34) will cause the instrument to store its last settings. If the **History** method setting is **Off**, all method settings and options will return to their default settings when you leave that method, unless it has been saved as part of a method.

- Press Options to view the Options menu.

The options are:

Option	Text	Function
1	Method Settings	Returns to the Method Settings screen for the method.
2	Print	Prints the results.
3–6	N/A	Specific to the method.
7	Sample Number	Defines the sample number you wish to start taking measurements from.
8	Save Method	Saves the Method Settings as a new method, with a defined method name, in the Methods or Favorites folder.
9	Auto-Print	Toggles Auto-Print on and off. The default is off.

- Press or , or wait 20 seconds to exit the method options.

You can use the numeric keys as a shortcut to the option required without needing to enter the Options menu.

Methods and Favorites

The Methods folder allows you to store user-modified methods, based on the default instrument methods, which can be saved using the Options menu. Up to 9 methods can be saved in each folder. To retrieve previously stored methods, press the appropriate keypad number to enter the Methods folder. You can also import methods from an SD card or export methods to an SD card.

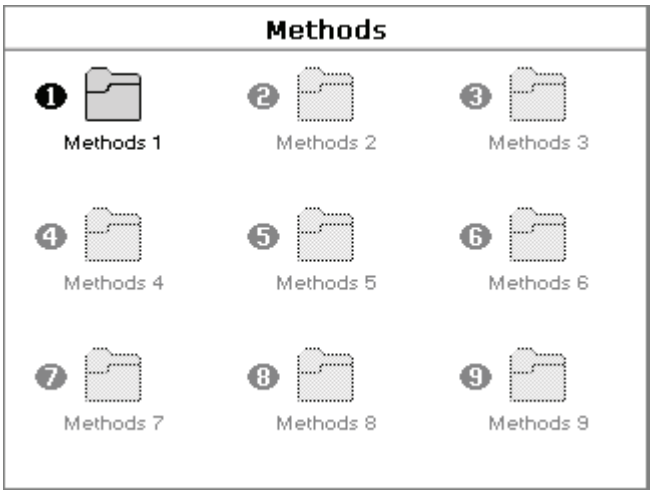


Figure 7 Methods folder

Folder Options

Press to display the available Options in the Methods folder, which you can select using the keypad numbers:

Option	Text	Function
1	Folder Names	Allows the Method Folder to be renamed.
2	Lock Folder	Allows the user to Lock the folder.
3	Unlock Folder	Allows the user to Unlock the folder.
4	SD Memory Card	Allows the User to open the SD card. (This option is only applicable if you have an SD installed in the instrument.)

Folder Names

1. Open the Methods folder.
2. Press to display the available Options.
3. Press 1 to select **Folder Names**.
4. Select the **Folder** you wish to rename using the left and right arrows, and then press the down arrow.
5. Enter a **New Name** for the folder using the alphanumeric keypad.
6. Press **OK** to rename the folder.

Lock Folder

1. Open the Methods folder.
2. Press to display the available Options.
3. Press 2 to select **Lock Folder**.
4. Select the **Folder** you wish to lock using the left and right arrows, and then press the down arrow.
5. Enter a **Pass Code** for the folder using the keypad numbers or left and right arrows.
6. Press **OK** to lock the folder.

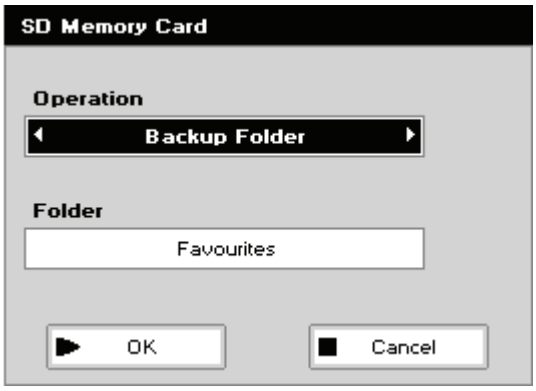
Unlock Folder

1. Open the Methods folder.
2. Press to display the available Options.
3. Press 3 to select **Unlock Folder**.
4. Select the **Folder** you wish to unlock using the left and right arrows, and then press the down arrow.
5. Enter the **Pass Code** for the folder using the keypad numbers or left and right arrows.

SD Memory Card

1. Open the Methods folder.
2. Press to display the available Options.

3. Press 4 to select **SD Memory Card**.
   The SD Memory Card screen is displayed.



4. Select the mode of **Operation** using the left and right arrows, then press the down arrow.
   The options are **Backup Folder**, if you wish to copy the contents of the folder to the SD card, and **Restore Folder**, if you wish to restore the contents of the folder to the content of the SD card. **Backup All Folders** copies the contents of all the Methods folders to the SD card. **Restore All Folders** restores the contents of all the Methods folders to the content of the SD card.

NOTE: The LED next to the card will be lit while methods are saved to the card. The card must not be removed while the LED is lit as it will corrupt your method(s).

5. Select the **Folder** using the left and right arrows.

6. Press **OK** .

Method Options

Press to display the available Options in the Methods folder, which you can select using the keypad numbers:

Option	Text	Function
1	Delete Method	Deletes the Method.
2	Lock Method	Allows the user to Lock the method.
3	Unlock Method	Allows the user to Unlock the method.

Delete Method

1. Open the appropriate methods folder.
2. Press to display the available Options.
3. Press 1 to select **Delete Method**.
4. Select the method to be deleted using the left and right arrows.
5. Press **OK** to delete the method.

Lock Method

1. Open the appropriate methods folder.
2. Press to display the available Options.
3. Press 2 to select **Lock Method**.
4. Select the method to be locked using the left and right arrows, then press the down arrow.
5. Select a pass code using the keypad numbers or left and right arrows.
6. Press **OK** to lock the method.

Unlock Method

1. Open the appropriate methods folder.
2. Press to display the available Options.
3. Press 3 to select **Unlock Method**.
4. Select the method to be unlocked using the left and right arrows, then press the down arrow.
5. Enter a pass code using the keypad numbers or left and right arrows.
6. Press **OK** to unlock the method.

Lambda XLS/XLS+ Instrument Methods

The pre-defined methods available on your Lambda XLS/XLS+ instrument are:

- Single Wavelength
- Multi Wavelength
- Spectrum
- Concentration
- Standard Curve
- Kinetics
- Absorbance Ratio.

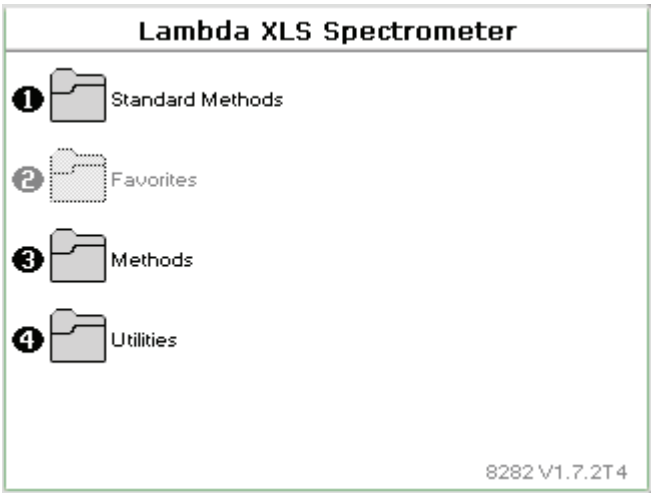


Figure 8 Lambda XLS home page

Utilities

You can use the Utilities folder to modify the instrument setup.

- Press the appropriate keypad number to enter the Utilities folder.
  The Utilities screen is displayed.

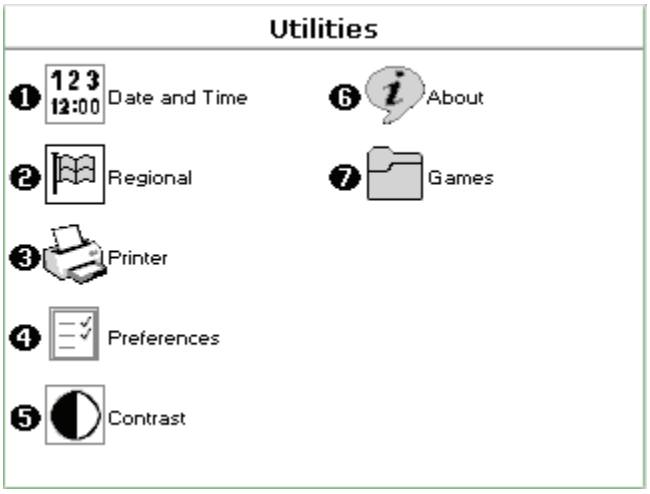


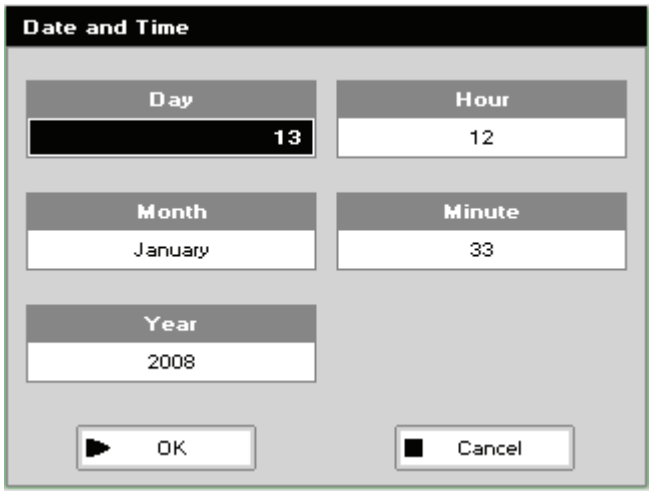
Figure 9 The Utilities screen

The Utilities are:

1	Date and Time	Set correct time and date.
2	Regional	Select preferred language and number format.
3	Printer	Printer/output options.
4	Preferences	Select screen layout (themes) and history.
5	Contrast	Adjust screen contrast and brightness.
6	About	Serial number and software version.
7	Games	Spectro Blocks/Sudoku.

Date and Time

1. Press 1 to select **Date and Time**.
   The Date and Time screen is displayed.

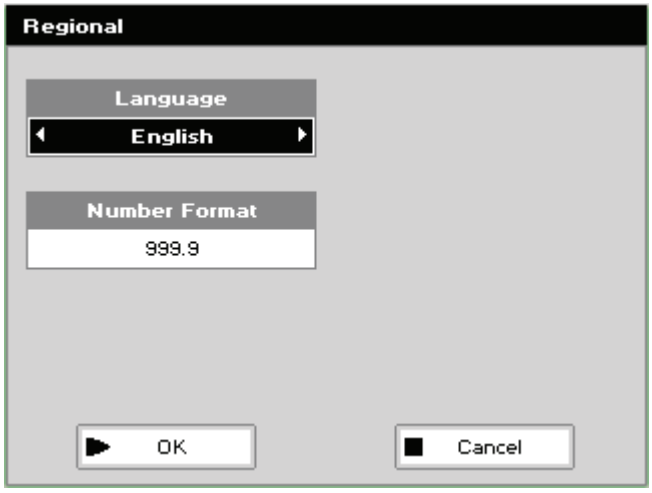


2. Using the keypad numbers or left and right arrows, enter the **Day**, **Month**, **Year**, **Hour** and **Minute**.

3. Press **OK** to store the settings to store the settings and return to the Utilities folder.
   Seconds are zeroed when you press **OK**.

Regional

1. Press 2 to select **Regional**.
   The Regional screen is displayed.



2. Using the left and right arrows, select a **Language**, and then press the down arrow.
   The options are English, French, German, Italian, Japanese or Spanish.

3. Select the **Number Format** (the type of decimal separator) using the left and right arrows.

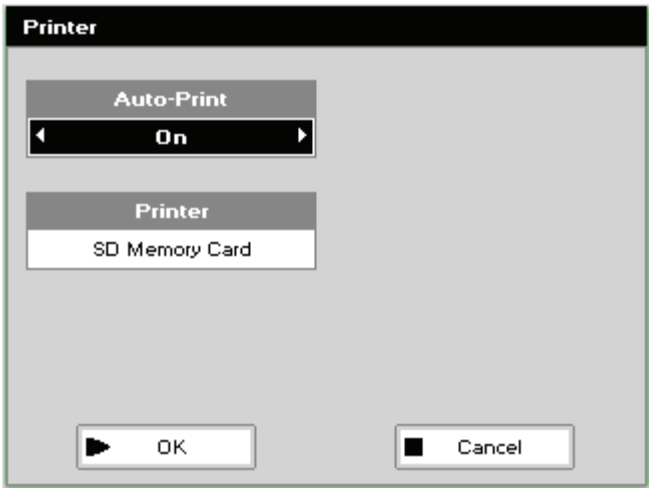
   The options are "," or ".".

4. Press **OK** to store the settings and return to the Utilities folder.

Printer

1. Press 3 to select **Printer**.

   The Printer screen is displayed.



2. Select whether **Auto-Print** is **On** or **Off** using the left and right arrows, and then press the down arrow.

   When **Auto-Print** is **On**, the results are automatically printed after a measurement is taken you exit the application, depending on the method.

   When **Auto-Print** is **Off**, printing has to be initiated manually.

3. Select how the data are sent.

   The options are **Built-in** (the internal printer), **Computer (USB)** (to a computer via USB port), **SD Memory Card** (to the SD card) or **Computer (Bluetooth)** (to a computer via Bluetooth).

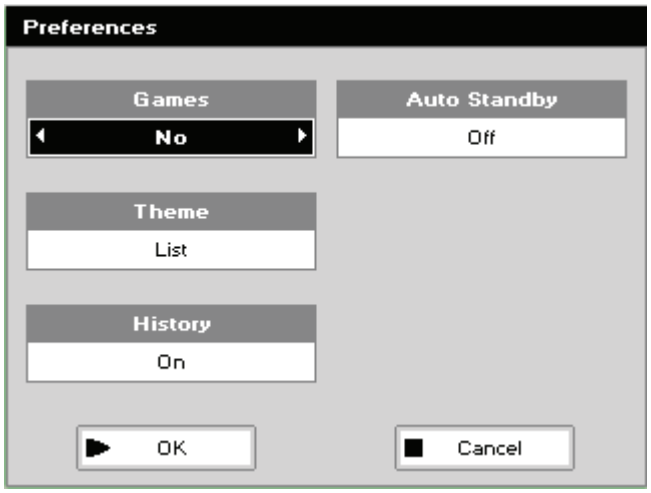
   The options available depend on what is installed in your instrument.

NOTE: If an SD Memory Card is installed in your instrument, the LED next to the card will be lit while data is being printed to the card. Removing the card while the LED is lit could corrupt your data. For some methods you have to exit the method to end printing. See the *Lambda Bio/XLS Print Utility User's Guide* (L6050015) on the *Lambda Bio/XLS User Manuals CD* (L6050018) for more information.

4. Press **OK** to store the settings and return to the Utilities folder.

Preferences

1. Press 4 to select **Preferences**.
   The Preferences screen is displayed.



2. Select whether **Games** are turned available using the left and right arrow keys.
   The options are **Yes** or **No**.

3. Define the **Theme** (the onscreen layout of folders).
   The options are either a **Grid** format or a **List**.

4. Select the **History** mode using the left and right arrow keys.
   If **Off** is selected the instrument will not remember your method settings unless you restore them as a new method. The default is **Off**.

5. Select whether to use an **Auto Standby** mode after defined periods.
   The options are **1 hour**, **2 hours**, **At Night** or **Off**.

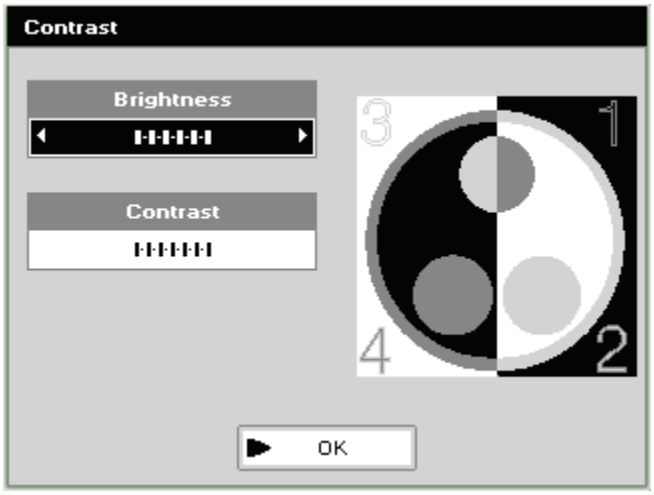
6. Press **OK** to store the settings and return to the Utilities folder.

Contrast

Ambient temperature can affect the display. The contrast function can optimize the display for local conditions.

The procedure is as follows:

1. Press 5 to select **Contrast**.
   The Contrast screen is displayed.



2. Adjust the **Brightness** using the left and right arrows, and then press the down arrow.
3. Adjust the **Contrast** using the left and right arrows.
4. Press **OK** to store the settings and return to the Utilities folder.

About

The About screen displays the instrument serial number and the software version.

1. Press 6 to select **About**.
   The About screen for your instrument is displayed.
2. Press **OK** to close the window and return to the Utilities folder.

Sample Handling

- The light beam is directed from RIGHT to LEFT through the cell chamber, as indicated by the white arrows on the instrument enclosure. Make sure that the cell is inserted in the correct alignment.

- The cell holder supplied with the instrument accepts standard 10–40mm (Lambda XLS) or 10 mm (Lambda XLS+) pathlength quartz, glass or plastic cells.

- The optical height is 15 mm, and the minimum volume that can be used is approximately 70 µl in a micro cell.

- 12 mm test tubes may be used (for example, for cell cultures). However, they are not recommended as-higher quality data is produced by using disposable cuvettes for the analysis. If used, align the indicator line on 12 mm test tubes in the same direction to ensure reproducible positioning of the tube. Note that test tubes do not last forever, and that the surface becomes scratched and blemished through repetitive use – if this is the case they should be replaced.

NOTE: When using calibration standard filters, insert such that the flat surface is facing away from the spring end of the cell holder.

NOTE: A cover is provided to keep the sample compartment free from dust and debris. When the instrument is in use, the dust cover should be kept in a safe place, nearby.

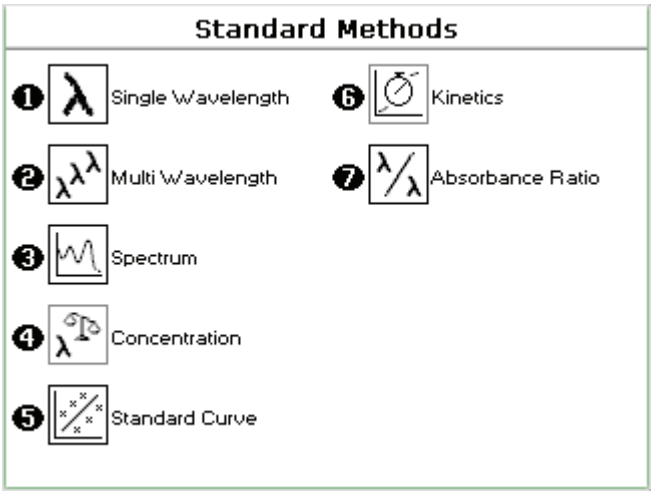
Instrument Methods

Single Wavelength

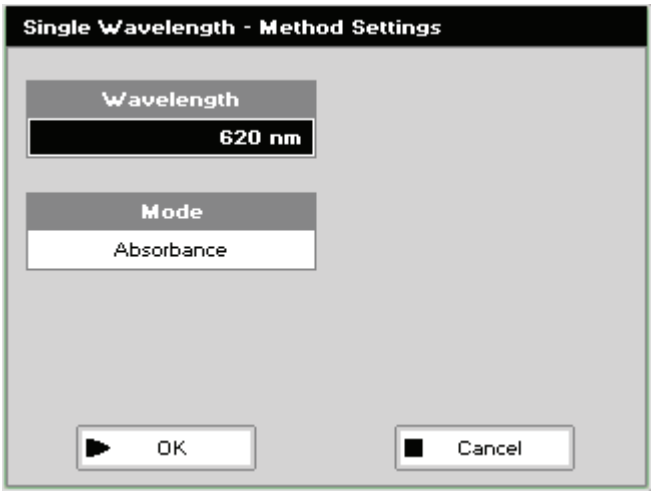
The Single Wavelength method makes absorbance (A) and percentage transmission (%T) measurements on samples, by measuring the amount of light that has passed through a sample relative to a reference (this can be air).

The procedure is as follows:

1. Press 1 to open the Standard Methods folder.
   The Standard Methods screen is displayed.



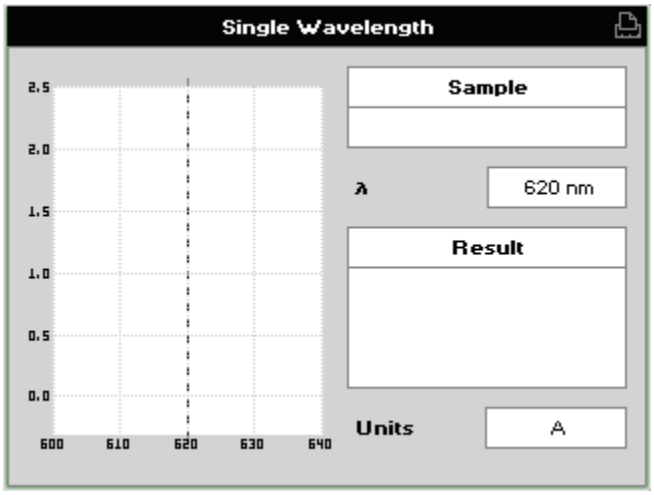
2. Press 1 to open the Single Wavelength method.
   The Single Wavelength – Method Settings screen is displayed.



3. Set the **Wavelength** by using the keypad numbers or the left and right arrows, then press the down arrow.

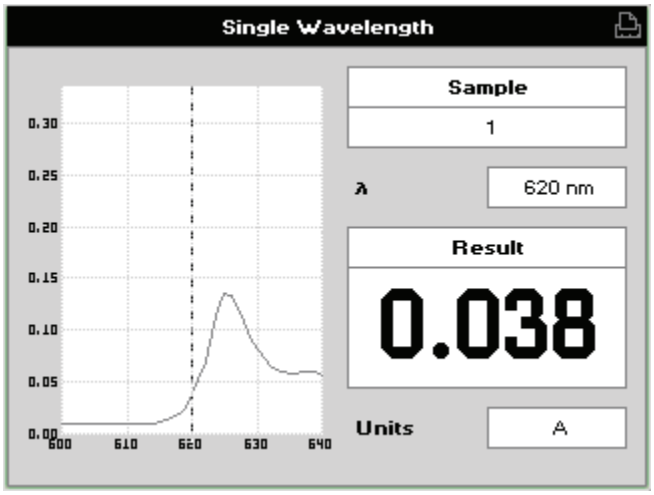
4. Select the **Mode**, using the left and right arrows.
   The options are **Absorbance** or **%Transmission**.

5. Press **OK** to start measurements.
   The Single Wavelength results screen is displayed.



6. Insert the reference sample and press 0A / 100%T.
   This reference measurement will be used for all subsequent samples until repeated.

7. Insert your first sample and press .
   The result at the selected wavelength is displayed on screen. Use the left and right arrows to move the cursor and display the value at the cursor position (±20 nm from the set wavelength).



8. Repeat Step 7 for each sample.

- Press to display the available Options, which you can select using the keypad numbers:

1	Method Settings	Returns to the Method Settings screen.
2	Print	Prints result via selected method.
3	A/%T	Toggles between Absorbance and %Transmission mode.
4	Print Graph	Prints Graph (this option is grayed out if no data are available).
7	Sample Number	Adds a prefix to the sample number and resets the incrementing number to the desired value.
8	Save Method	Use the left and right arrows to select a folder to store the method in (Favorites/Methods 1–9), then press the down arrow and enter a name for the method. Press **Save** to save the method.
9	Auto-Print	Toggles Auto-Print on and off.

- Press or , or wait 20 seconds to exit the method options.

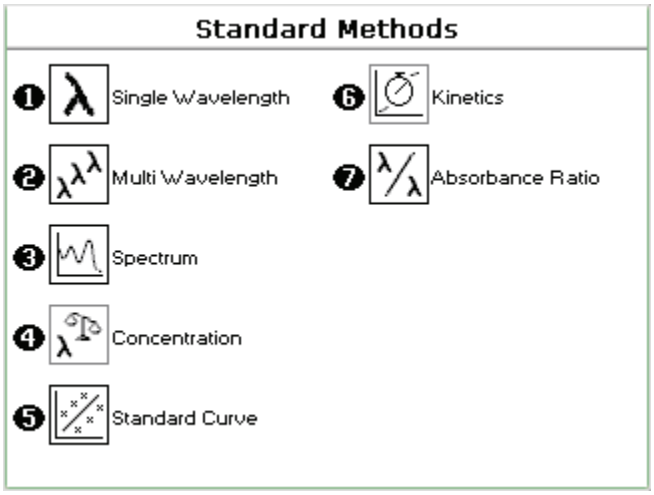
- Press to return to the Standard Methods folder after all your samples have been measured.

Multi Wavelength

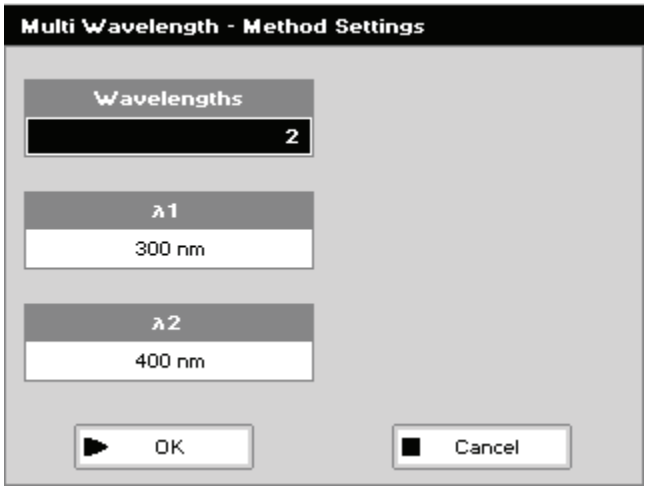
The Multi Wavelength method can provide absorbance readings at up to 5 wavelengths.

The procedure is as follows:

1. Press 1 to open the Standard Methods folder.
   The Standard Methods screen is displayed.



2. Press 2 to open the Multi Wavelength method.
   The Multi Wavelength – Method Settings screen is displayed.

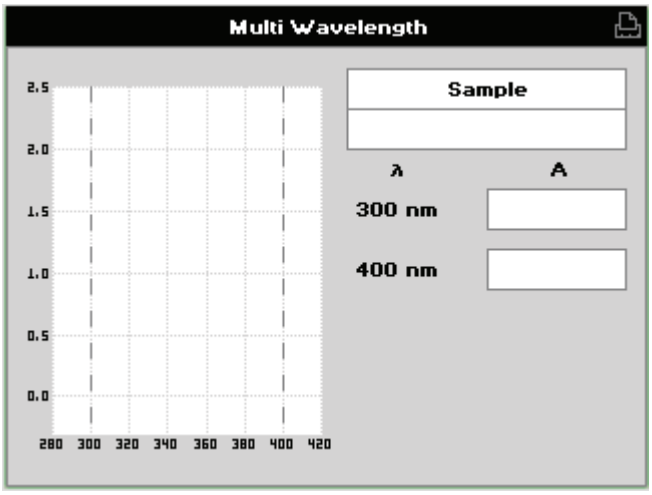


3. Select the number of **Wavelengths**, then press the down arrow.
   The options are between 2 and 5.

4. Enter the first wavelength (**λ1**) using either the number keys or the left and right arrows, then press the down arrow.

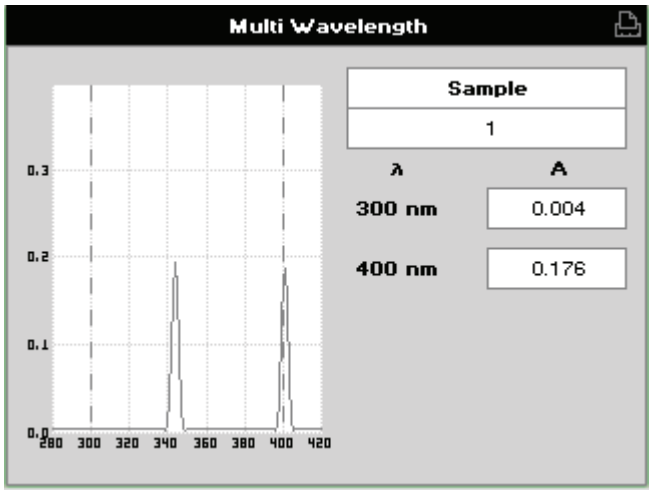
5. Repeat Step 4 for each of the wavelengths.

6. Press **OK** to start measurements.
   The Multi Wavelength results screen is displayed.



7. Insert the Reference sample and press 0A/100%T.
   This reference measurement will be used for all subsequent samples until repeated.

8. Insert your first sample and press .



   A spectrum covering the range of wavelengths is displayed, with cursors marking the chosen wavelengths. A table of the absorbance values at those wavelengths is also displayed.

9. Repeat Step 8 for each sample.

- Press to display the available Options, which you can select using the keypad numbers:

1	Method Settings	Returns to the Method Settings screen.
2	Print	Prints the data on the results screen (the absorbance table) via the selected method.
4	Print Graph	Prints the graph (this option is grayed out if no data are available).
7	Sample Number	Adds a prefix to the sample number and resets the incrementing number to the desired value.
8	Save Method	Use the left and right arrows to select a folder to store the method in (Favorites/Methods 1–9), then press the down arrow and enter a name for the method. Press **Save** to save the method.
9	Auto-Print	Toggles Auto-Print on and off.

- Press or , or wait 20 seconds to exit the method options.

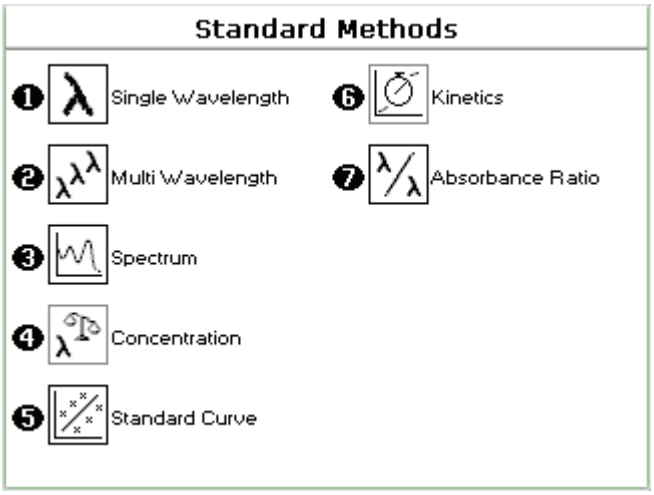
- Press to return to the Standard Methods folder after all your samples have been measured.

Spectrum

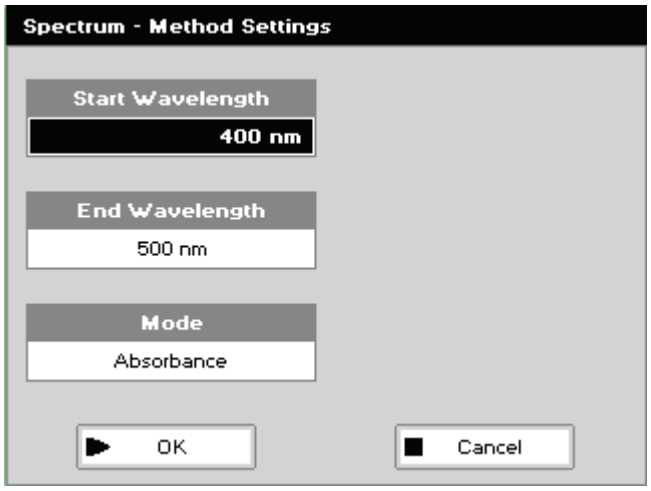
The Spectrum method enables you to collect an absorption spectrum, and determine peak heights and positions.

The procedure is as follows:

1. Press 1 to open the Standard Methods folder.
   The Standard Methods screen is displayed.



2. Press 3 to open the Spectrum method.
   The Spectrum – Method Settings screen is displayed.

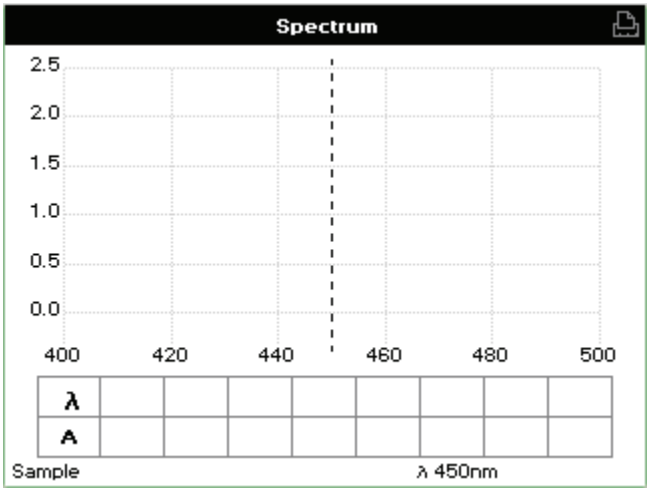


3. Set the **Start Wavelength** by using the keypad numbers or the left and right arrows, then press the down arrow.

4. Set the **End Wavelength** by using the keypad numbers or the left and right arrows, then press the down arrow.

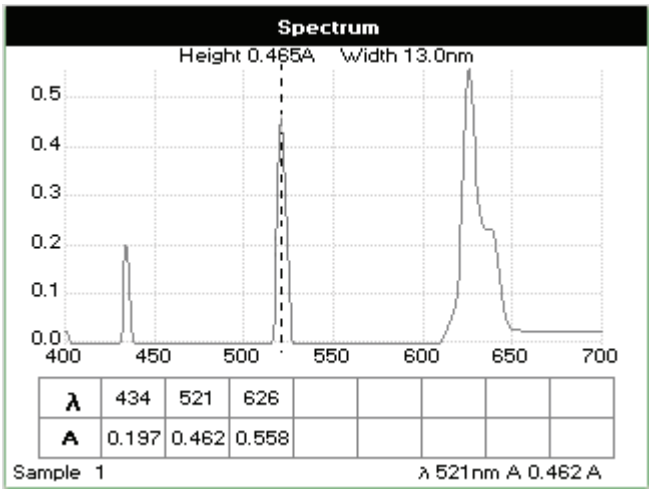
5. Select the **Mode** using the left and right arrows, then press the down arrow.
   The options are **Absorbance** or **%Transmission**.

6. Press **OK** to start measurements.
   The Spectrum results screen is displayed.



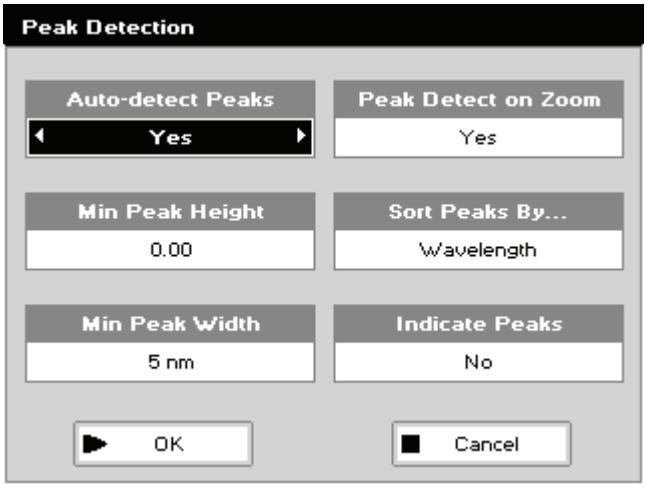
7. Insert the Reference sample and press 0A/100%T.
   This reference measurement will be used for all subsequent samples until repeated.

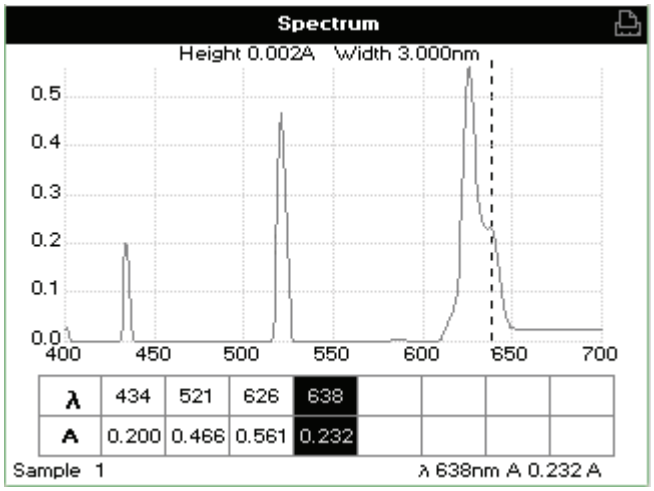
8. Insert your first sample and press .
   A spectrum and a table of the Absorbance/%Transmission values at each peak are displayed.
   Use the left and right arrows to move the cursor along the graph. When it reaches a peak, the peak height and width are displayed at the top of the screen. To zoom in on the wavelength scale, use the up arrow key. This automatically scales the Absorbance/%Transmission axis (depending upon the Graph Scale option) and this is retained for subsequent measurements. To zoom out again, use the down arrow key.

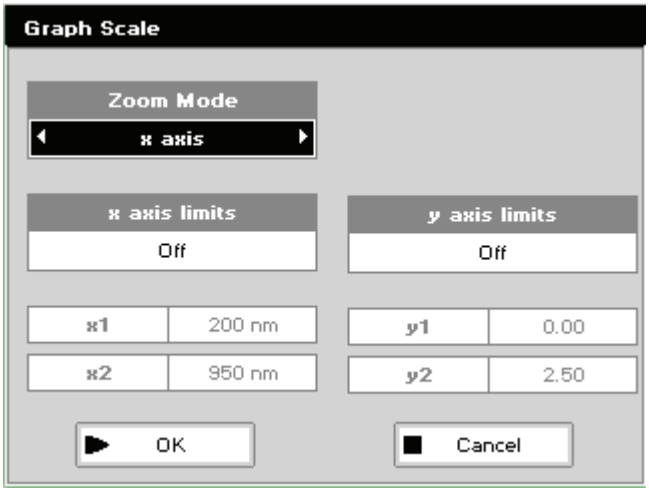


9. Repeat Step 8 for each sample.

➢ Press to display the available Options, which you can select using the keypad numbers:

1	Method Settings	Returns to the Method Settings screen.
2	Print	Prints result via selected method.
3	A/%T	Toggles between Absorbance and %Transmission mode
4	Peak Detection	Displays the Peak Detection settings screen.  **Auto-detect Peaks**: Turns on and off the automatic peak detection. The following options determine how peaks are detected: • **Min Peak Height**: Minimum height the peak has to be above the higher of the two adjacent minima for the peak to be detected. • **Min Peak Width**: Minimum width of the peak as determined by the difference in wavelength between the higher of the two adjacent minima and the opposing intersection of that higher minimum level and the peak profile. • **Peak Detect on Zoom**: Determines if peaks are reassessed and tabulated when you zoom into a region of the spectrum. If **No** is selected, the peak detection remains as determined before zooming. • **Sort Peaks By**: Determines the sequence that peaks are reported by. The options are **Peak Width**, **Wavelength** and **Peak Height**. • **Indicate Peaks**: Switches display of peak cursors on and off. The peak cursors show vertical dashed lines displaying the measured peak height and horizontal dashed lines showing the peak width. ➢ Press to cancel the selections; press to accept them.

5	Add Peak/Delete Peak	Add Peak manually adds a peak position to the peak table in the results screen at the position set by the cursor. The entry in the peak table is then displayed in inverse coloring to discriminate between User Defined Peaks and Auto-Detect peaks. If the cursor is positioned over a user-defined peak, the legend **User Defined Peak** is displayed at the top of the scan. The option then changes to **Delete Peak** to enable you to remove the peak.  **NOTE:** Saving a method at this stage will save these user-defined wavelengths, so that each time the method is run the Absorbance values at these wavelengths are reported.

6	Graph Scale	Displays the Graph Scale settings screen. This enables you to set up a defined graph by defining the limits in either or both of the *x* and *y* axes.  **Zoom Mode:** This sets up the operation of the Zoom keys (up and down arrows). The mode ***x* axis** zooms the display around the cursor point ***x*** axis, the mode ***y* axis** zooms the display around the cursor point ***y*** axis, and ***x* & *y* axes** expands both axes about the cursor point. With *x* or *y* axis limits set to on, zooming out will only be permitted within the set limits. ***x* axis limits**/***y* axis limits**: Setting to **On** activates the start and finish points of the desired graph to user-defined, specific wavelengths and/or absorbance values. ➢ Press ■ to cancel the selections; press ▶ to accept them and display the required graph.
7	Sample Number	Adds a prefix to the sample number and resets the incrementing number to the desired value.
8	Save Method	Use the left and right arrows to select a folder to store the method in (Favorites/Methods 1–9), then press the down arrow and enter a name for the method. Press **Save** ▶ to save the method.
9	Auto-print	Toggles Auto-Print on and off.

➢ Press ☰ or ■, or wait 20 seconds to exit the method options.

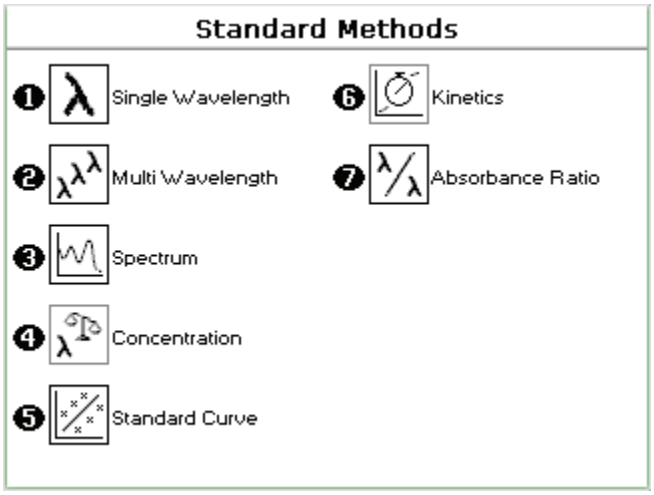
➢ Press ■ to return to the Standard Methods folder after all your samples have been measured.

Concentration

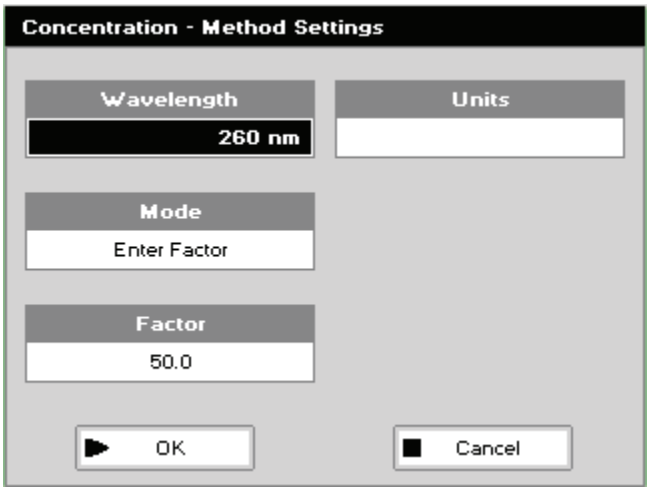
The Concentration method makes simple concentration measurements on samples by measuring the amount of light that has passed through a sample relative to a reference (this can be air). The concentration is determined by measuring the absorbance at a specific wavelength and then multiplying by a factor. If the factor is known in advance it can be entered into the method. If the factor is not known, a standard of known concentration can be measured and the factor then calculated by the instrument.

The procedure is as follows:

1. Press 1 to open the Standard Methods folder.
   The Standard Methods screen is displayed.



2. Press 4 to open the Concentration method.
   The Concentration – Method Settings screen is displayed.



3. Enter the **Wavelength** by using the keypad numbers or the left and right arrows, then press the down arrow.

4. Select the **Mode** using the left and right arrows, then press the down arrow.

   The options are **Enter Factor** (where a known factor is entered), **Measure Standard** (where the factor is calculated from a calibration sample), **Enter Neg. Factor** (where a known negative factor is entered).

5. If you selected **Enter Factor** or **Enter Neg. Factor**, enter the **Factor** (or **Negative Factor**) using the keypad numbers, then press the down arrow.

   The available range is from 0.01 to 9999.

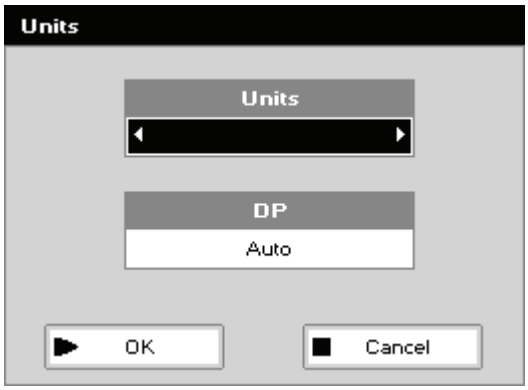
   OR

   If you selected **Measure Standard**, enter the **Concentration** using the keypad numbers, then press the down arrow.

   The available range is from 0.001 to 9999.

6. Enter the **Units**, then press the down arrow.

   You can enter text up to 8 characters long using the keypad, or press Options to display the Units screen and access a list of pre-defined units.



   In the Units screen, use the left and right arrows to select from the available options. The options are **µg/ml**, **µg/µl**, **pmol/µl**, **mg/dl**, **mmol/l**, **µmol/l**, **g/l**, **mg/l**, **µg/l**, **U/l**, **%**, **ppm**, **ppb**, **conc** or none.

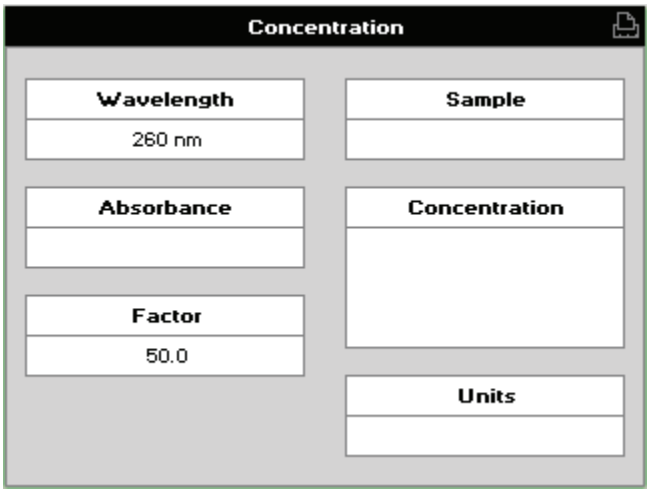
   The Units screen also enables you to select the number of displayed decimal points (**DP**). The options are **Auto**, **0**, **1** and **2**.

NOTE: The result will always be fixed to 5 significant figures, regardless of how many decimal points are selected (so 98768.2 is displayed as 98768, even with 1 decimal point selected).

Press **OK** to save your options and return to the Method Settings screen.

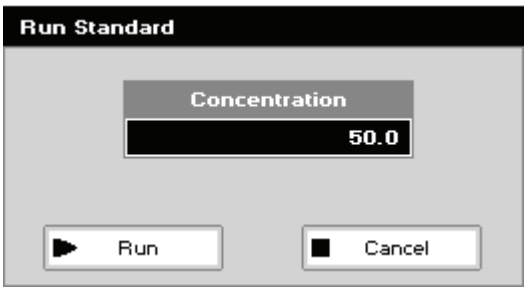
The units can still be edited.

7. Press **OK** to start measurements.
   The Concentration results screen is displayed.



8. Insert the Reference sample and press 0A 100%T.
   This reference measurement will be used for all subsequent samples until repeated.

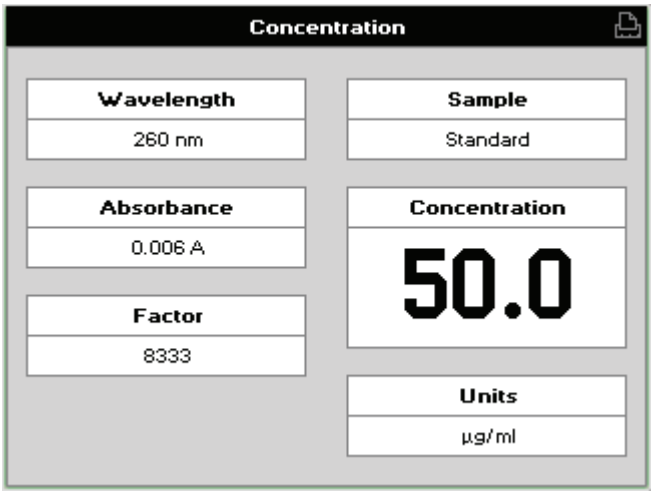
9. If you selected Measure Standard, insert your standard and press **OK**.
   The Run Standard screen is displayed.



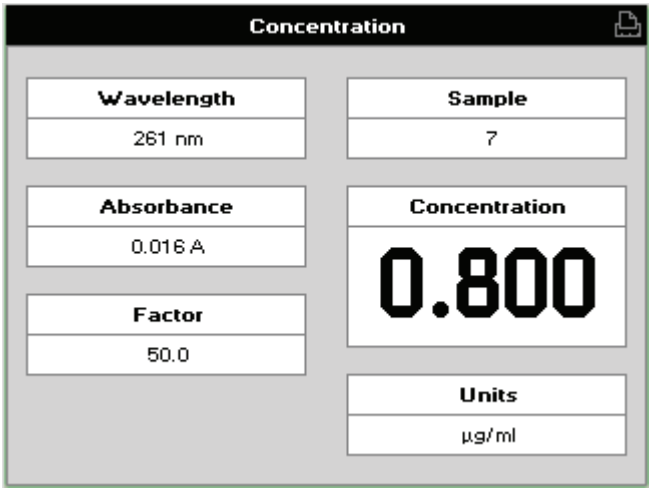
   OR

   If you selected Factor, go to Step 11.

10. Press **Run** to run the standard.
    The Factor is calculated and displayed.



11. Insert your first sample and press .
    The Concentration of the sample is displayed.



12. Repeat Step 11 for each sample.

- Press to display the available Options, which you can select using the keypad numbers:

1	Method Settings	Returns to the Method Settings screen.
2	Print	Prints result via selected method.
3	Show Graph	Toggles the graph on and off. The wavelength range of the graph displayed is ±20 nm from the selected wavelength, which is marked by the cursor.
4	Run Standard	Returns to the Run Standard screen.
7	Sample Number	Adds a prefix to the sample number and resets the incrementing number to the desired value.
8	Save Method	Use the left and right arrows to select a folder to store the method in (Favorites/Methods 1–9), then press the down arrow and enter a name for the method. Press **Save** to save the method.
9	Auto-Print	Toggles Auto-Print on/off.

- Press or , or wait 20 seconds to exit the method options.

- Press to return to the Standard Methods folder after all your samples have been measured.

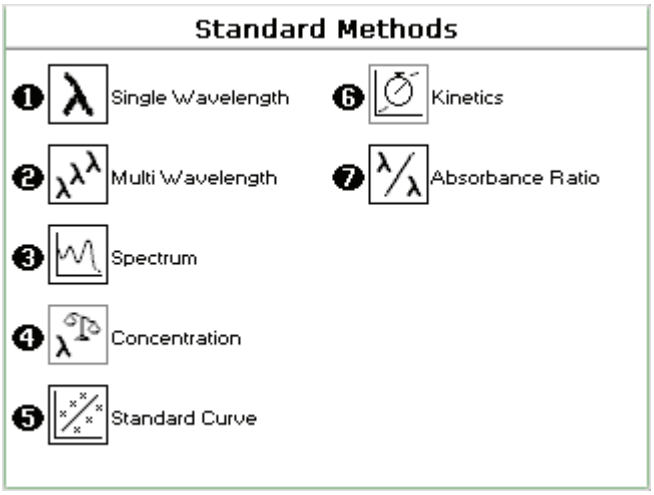
Standard Curve

This method enables the construction of a multi-point calibration curve from standards of known concentration that can then be used to quantify unknown samples. This instrument has the advantage of being able to store this curve as a method, using up to nine standards.

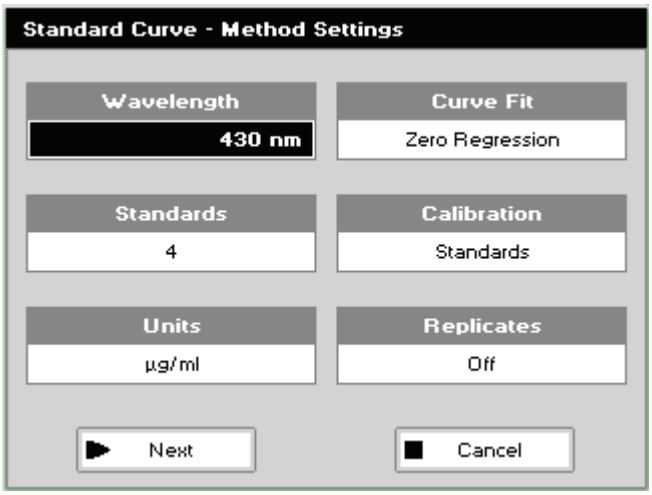
If you wish to have a zero concentration standard, include this in the number of standards to be entered and enter 0.00 for the Concentration, then use a reagent blank when required to enter the zero standard.

The procedure is as follows:

1. Press 1 to open the Standard Methods folder.
   The Standard Methods screen is displayed.



2. Press 5 to open the Standard Curve method.
   The Standard Curve – Method Settings screen is displayed.



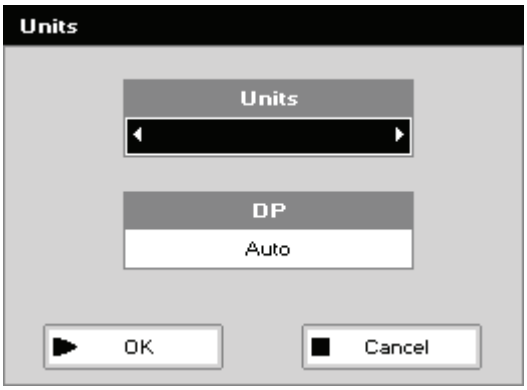
3. Enter the required **Wavelength** using the keypad numbers or left and right arrows, then press the down arrow.

4. Enter the number of **Standards** to be used in the standards curve, then press the down arrow.

   The options are from 1–9.

5. Enter the **Units**, then press the down arrow.

   You can enter text up to 8 characters long using the keypad, or press Options to display the Units screen and access a list of pre-defined units.



   In the Units screen, use the left and right arrows to select from the available options. The options are **µg/ml**, **µg/µl**, **pmol/µl**, **mg/dl**, **mmol/l**, **µmol/l**, **g/l**, **mg/l**, **µg/l**, **U/l**, **%**, **ppm**, **ppb**, **conc** or none.

   The Units screen also enables you to select the number of displayed decimal points (**DP**). The options are **Auto**, **0**, **1** and **2**.

NOTE: The result will always be fixed to 5 significant figures, regardless of how many decimal points are selected (so 98768.2 is displayed as 98768, even with 1 decimal point selected).

   Press **OK** to save your options and return to the Method Settings screen.

   The units can still be edited.

6. Select the type of **Curve Fit** using the left and right arrows, then press the down arrow.

   The options are **Zero Regression** (this forces the straight line through the origin), **Regression** (straight-line regression), **Interpolation** (linear interpolation) or **Cubic Spline**.

7. Select the **Calibration** mode using the left and right arrows.

   The options are **Standards** (to measure prepared standards) or **Manual** (entering absorbance values by keypad) or **New Standards** (to replace any standards that have already been collected).

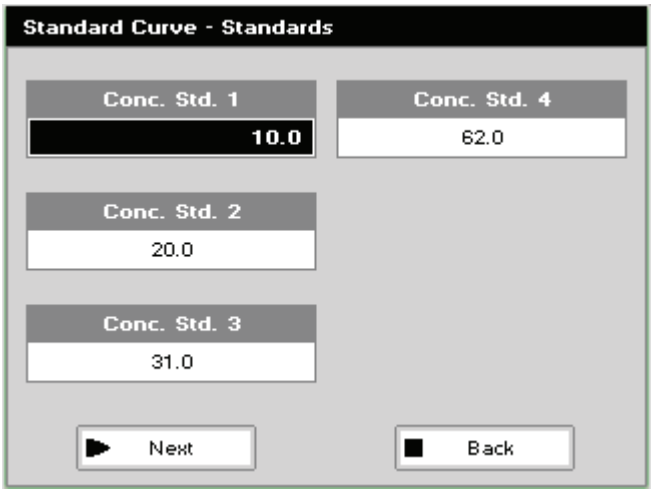
8. If you selected **Standards**, press the down arrow and enter the number of **Replicates**.

   This determines the number of standards to be measured and averaged at each standard concentration point.

   The options are **Off** (1), **2** or **3**.

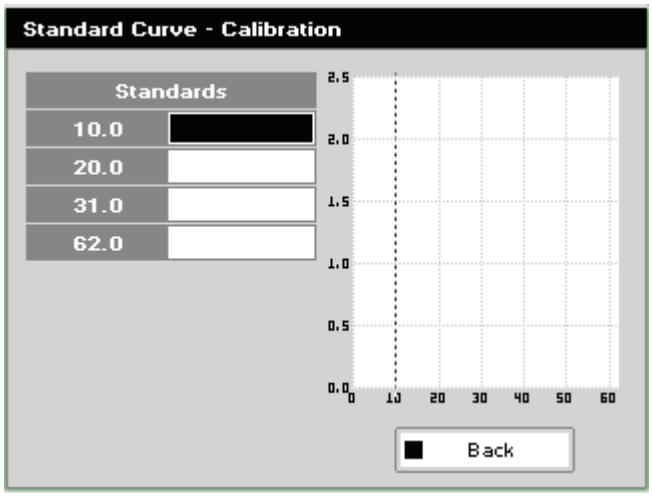
NOTE: If you selected **Manual** in Step 7, you do not enter Replicates.

9. Press **Next** .
   The Standard Curve – Standards screen is displayed.



10. Enter the concentration values for each standard using the keypad numbers and the up and down arrows to move between the different standard boxes.
    The available range is from 0.001 to 9999.

11. Press **Next** .
    The Standard Curve – Calibration screen is displayed.



NOTE: If any duplicate or non-monotonic entries are entered on the Standards screen, when **Next** is pressed the instrument will beep and highlight the incorrect entry.

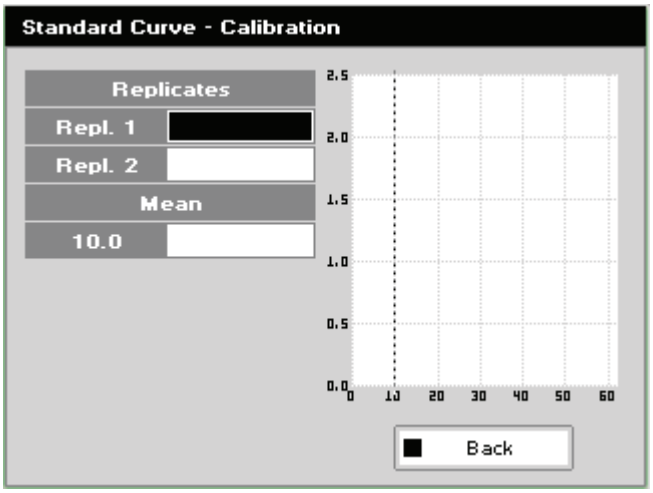
12. If you selected **Standards**, insert the reference sample and then press 0A / 100%T.
    This reference measurement will be used for all subsequent samples until repeated.

    OR

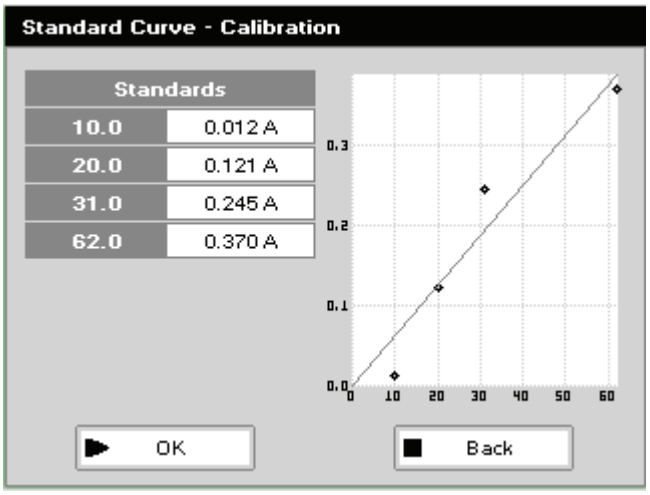
    If you selected **Manual**, enter the known absorbance value for each concentration using the keypad. Go to Step 15.
    The available range is from 0.001 to 9999.

13. Insert your first standard and press ▶.

    If there are any replicates, press **Replicates** ▶ to view them, then press ▶ to measure each replicate.

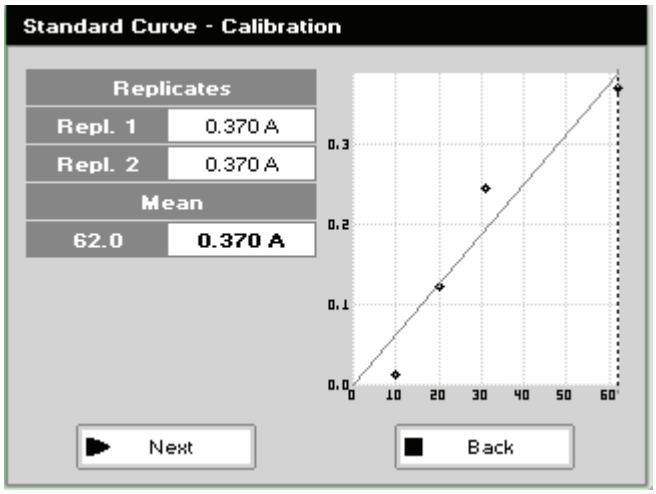


14. Repeat Step 13 for all your standards.
    A graph will display the results and the curve fit (for example, zero regression) as the measurements are made.

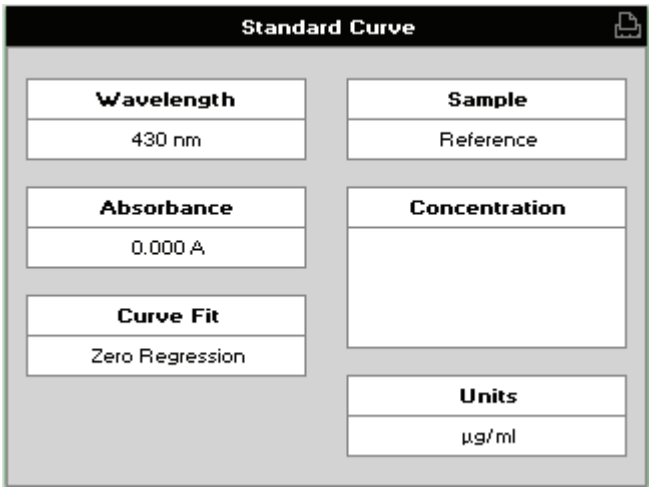


NOTE: You can use the up and down arrows to select a standard to be repeated if a poor reading has been obtained. Press C to clear the previous reading before measuring.

If you selected Replicates, when all replicates have been measured, press **Next** to return to the Standards screen.



15. Press **OK** to accept the calibration.
The Standard Curve results screen is displayed.

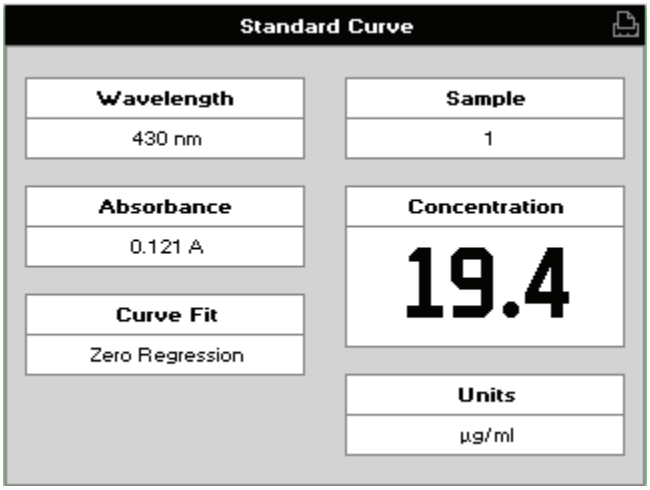


16. If you selected **Manual**, insert the reference sample and then press 0A 100%T.
This reference measurement will be used for all subsequent samples until repeated.

OR

If you selected Standards, go to Step 17.

17. Insert your first sample and press ▶.
    The absorbance of the sample is measured, and its concentration is calculated and displayed.



18. Repeat Step 17 for each sample.

➢ Press ☰ to display the available method options, which you can select using the keypad numbers:

1	Method Settings	Returns to the Method Settings screen.
2	Print	Prints the data on the results screen via selected method.
3	Show Graph	Toggles the calibration graph on and off. The cursors display the absorbance and corresponding concentration values of the last measured sample.
7	Sample Number	Adds a prefix to the sample number and resets the incrementing number to the desired value.
8	Save Method	Use the left and right arrows to select a folder to store the method in (Favorites/Methods 1–9), then press the down arrow and enter a name for the method. Press **Save** ▶ to save the method.
9	Auto-print	Toggles Auto-Print on and off.

➢ Press ☰ or ■, or wait 20 seconds to exit the method options.

➢ Press ■ to return to the Standard Methods folder after all your samples have been measured.

Kinetics

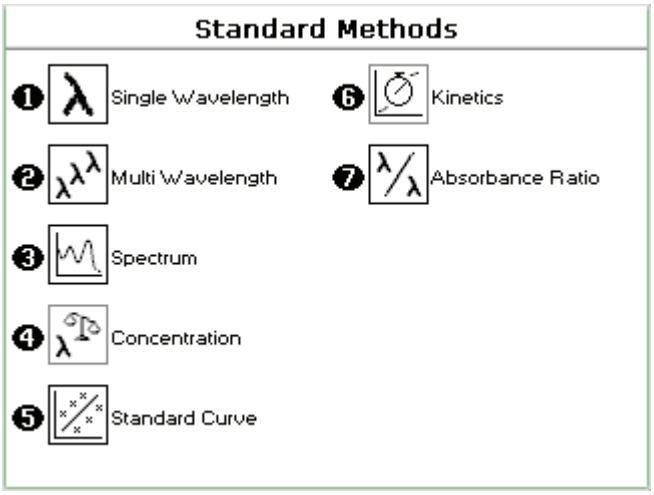
Kinetics studies, where the change in absorbance needs to be followed as a function of time at a fixed wavelength, can readily be performed using the Kinetics method.

Reagent test kits are routinely used for the enzymatic determination of compounds in food, beverage and clinical laboratories by measuring NAD/NADH conversion at 340 nm. The change in absorbance over a specified time period can be used to provide useful information when an appropriate factor, defined in the reagent-kit protocol, is applied. Reaction rate and enzyme activity can be calculated if the factor used takes account of the absorbance difference per unit time, as opposed to only the absorbance difference.

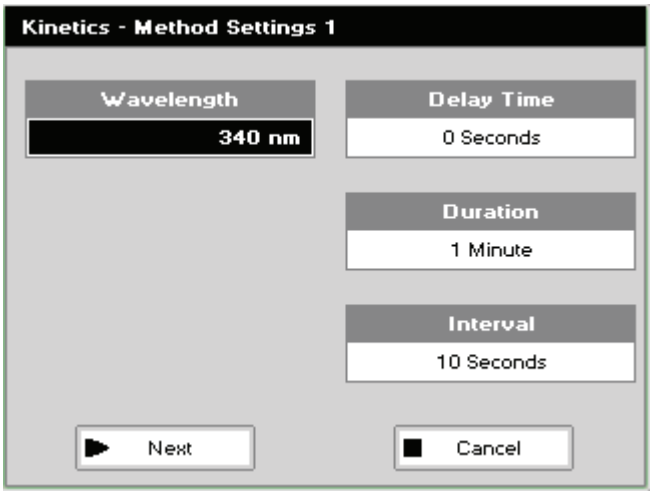
For this reason, the change in absorbance per minute (ΔA/min), concentration (ΔA/min x factor) and correlation coefficient (calculated from a best fit of the data points) are displayed. They may not be relevant for simple kinetics experiments.

The procedure to define a new method is as follows:

1. Press 1 to open the Standard Methods folder.
   The Standard Methods screen is displayed.



2. Press 4 to open the Kinetics method.
   The Kinetics – Method Settings 1 screen is displayed



   Enter all numerical values using the keypad numbers or the left and right arrows.

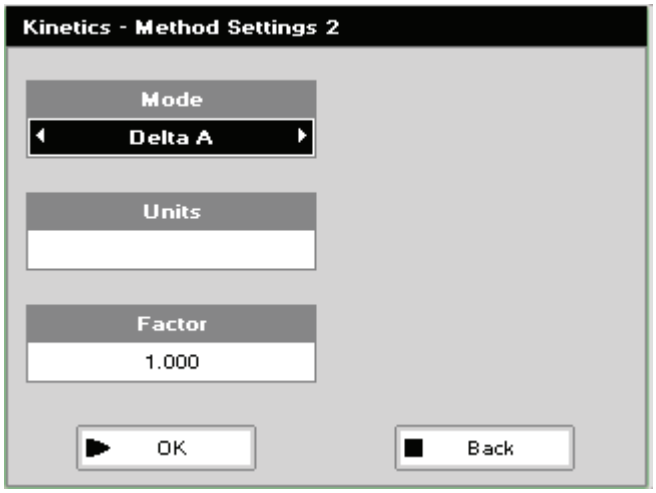
3. Set the **Wavelength** by using the keypad numbers or left and right arrows, then press the down arrow.
   The default value is 340 nm.

4. Enter the **Delay Time** in seconds before measurements are taken, then press the down arrow.
   This can be a maximum of 600 seconds (10 minutes).

5. Enter the time in minutes over which measurements are taken (**Duration**), then press the down arrow.
   This can be a maximum of 60 minutes.

6. Enter the **Interval** time in seconds between measurements using the left and right arrows, then press the down arrow.
   The options are **1**, **2**, **5**, **10**, **15**, **20**, **30** or **60** seconds.

7. Press **Next** .
   The Kinetics – Method Settings 2 screen is displayed.



8. Select the measurement **Mode** using the left and right arrows, then press the down arrow.

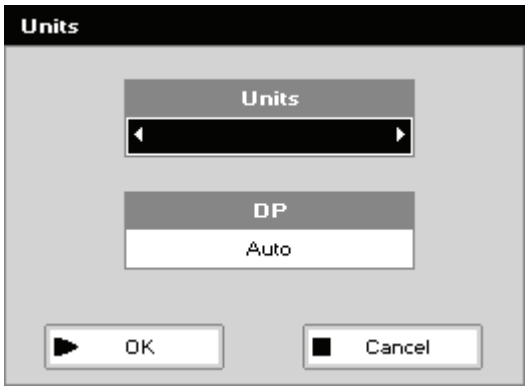
   The options are **Delta A** (the change in absorbance over the measurement duration, or selected period), **Final A** (the absorbance at the end of the measurement duration, or selected time) and **Slope** (the rate of change of absorbance over the measurement duration or selected period).

9. Enter the **Units**, then press the down arrow.

   You can enter a text string up to 8 characters long. To access a list of pre-defined units on the Units screen, press Options and then use the left/right arrows (**µg/ml, µg/µl, pmol/µl, mg/dl, mmol/l, µmol/l, g/l, mg/l, µg/l, U/l, %, ppm, ppb, conc** or none). These units can also be edited once **OK** is pressed.

   The Units screen also enables you to select the number of displayed decimal points (**DP**). The options are **Auto**, **0**, **1** and **2**.

NOTE: The result will always be fixed to 5 significant figures, regardless of how many decimal points are selected (so 98768.2 is displayed as 98768, even with 1 decimal point selected).



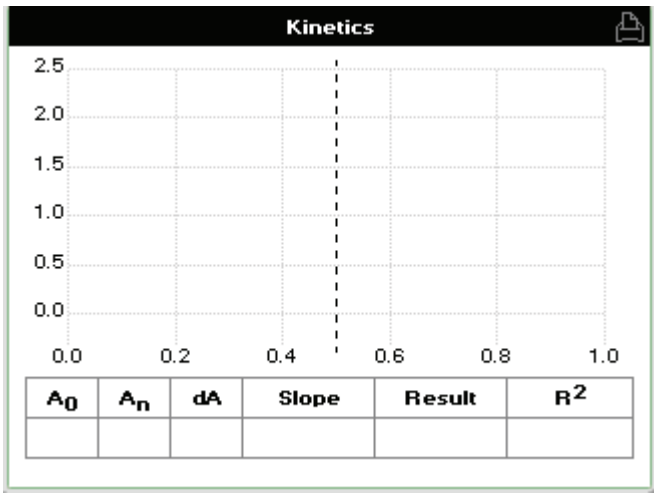
Press **OK** to save your options and return to the Method Settings screen.

The units can still be edited.

10. Set the **Factor** by which the result is multiplied to give the amount in the chosen range using the left and right arrows.

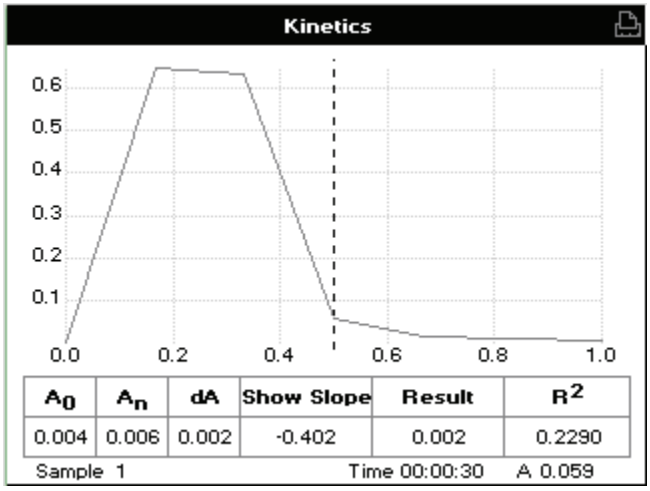
    The available range is from 0.01 to 9999.

11. Press **OK** to start measurements.
    The Kinetics results screen is displayed.



12. Insert the reference sample and press 0A / 100%T.
    This reference measurement will be used for all subsequent samples until repeated.

13. Insert your first sample and press to start the run.
    The running Time is displayed at the bottom of the screen, and absorbance data are plotted on the graph as the measurement proceed.
    The table below the graph displays $\mathbf{A_0}$, the absorbance value at t_0 (start of calculation); $\mathbf{A_n}$, the absorbance value at t_n (finish of calculation); **dA,** the change in absorbance; the **Slope** and the regression parameter ($\mathbf{R^2}$) of the calculated slope. The concentration is a calculated using the parameters selected in Method Settings 2 (**dA**, **Final A** or **Slope**) – the name of the **Result** table column depends on the units chosen.



- Use the left and right arrows to move the cursor and display the time and absorbance value at measured data points.

- Use the up and down arrows to zoom in or out.

➢ Press to display the available method options, which you can select using the keypad numbers:

1	Method Settings	Returns to the Method Settings screen.
2	Print	Prints the data on the results screen via selected method.
3	Print Data	Prints all the data.
4	Set t_0 at cursor	Sets the t_0 position (the starting point for the slope and dA calculations) at the current cursor position. The value is retained for subsequent samples.
5	Set t_n At Cursor	Sets the t_n position (the finishing point for the slope and dA calculations) at the current cursor position. The value is retained for subsequent samples.
6	Show Slope	Toggles the calculated slope line on and off. **NOTE:** If any data points enclosed by t_0 and t_n are beyond the range of the instrument (that is, >2.5 A or <−0.3 A) then this option is grayed out.
7	Sample Number	Adds a prefix to the sample number and resets the incrementing number to the desired value.
8	Save Method	Use the left and right arrows to select a folder to store the method in (Favorites/Methods 1–9), then press the down arrow and enter a name for the method. Press **Save** to save the method.
9	Auto-print	Toggles Auto-Print on and off.

➢ Press or , or wait 20 seconds to exit the method options.

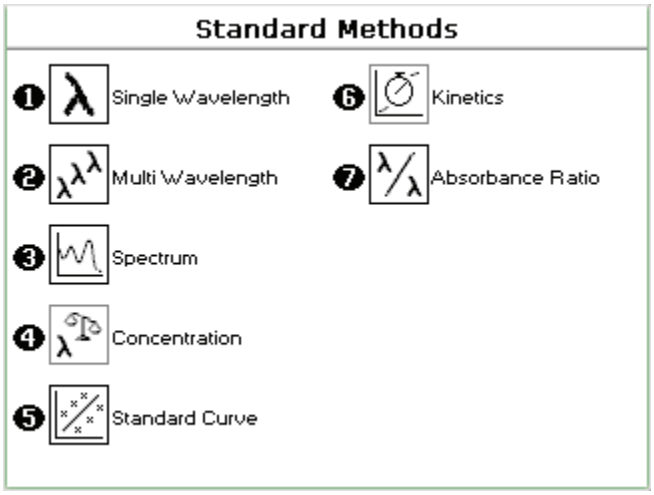
➢ Press to return to the Standard Methods folder after all your samples have been measured.

Absorbance Ratio

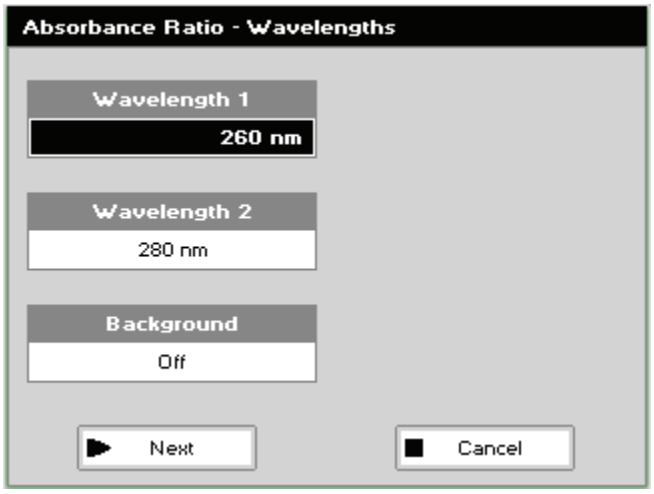
The Absorbance Ratio method makes simple absorbance ratio measurements on samples, measuring the amount of light that has passed through a sample relative to a blank (this can be air) at two wavelengths.

The procedure is as follows:

1. Press 1 to open the Standard Methods folder.
   The Standard Methods screen is displayed.



2. Press 7 to select the Absorbance Ratio method.
   The Absorbance Ratio – Wavelengths screen is displayed.



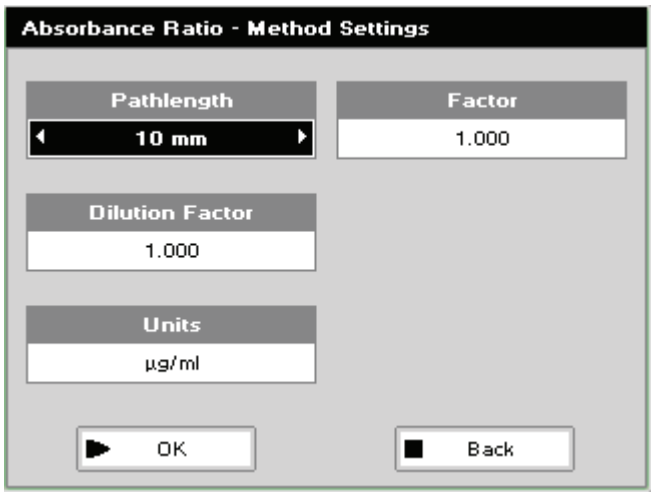
3. Enter **Wavelength 1** by using the keypad numbers or the left and right arrows, then press the down arrow.

4. Enter **Wavelength 2** as above and then press the down arrow.

5. Select whether a **Background** correction is applied to both wavelengths 1 and 2 using the left and right arrows.

6. If background correction is **On**, enter **Wavelength 3**, from which the background correction will be obtained.

7. Press **Next** .
   The Absorbance Ratio – Method Settings screen is displayed.

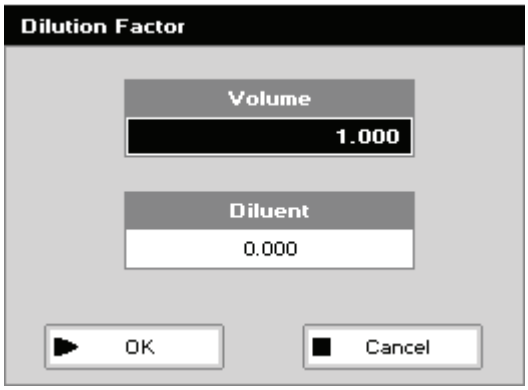


8. Select the **Pathlength** using the left and right arrows, then press the down arrow.
   The options are **5 mm** or **10 mm**.

9. If the **Dilution Factor** is known, enter a dilution factor by using the keypad numbers, press the down arrow, and then go to Step 12.
   The available range is from 1.00 to 9999.

   OR

   If the dilution factor is unknown, press Options to display the Dilution Factor screen.



10. Enter the **Volume** of the sample, using the keypad numbers, then press the down arrow.
    The available range is from 0.01 to 9999.

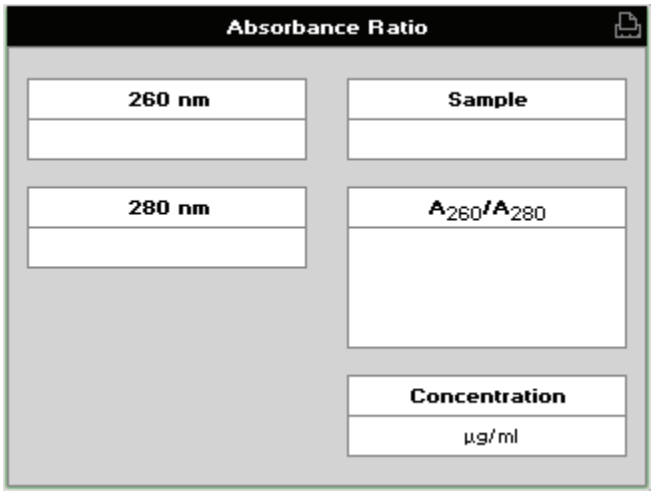
11. Enter the volume of **Diluent** by using the keypad numbers.
    The available range is from 0.01 to 9999.

12. Press **OK** to calculate the dilution factor and return to the Method Settings screen.

13. Select the **Units** of measurement using the left and right arrows, then press the down arrow.
    The options are **µg/ml**, **ng/µl**, **µg/µl**.

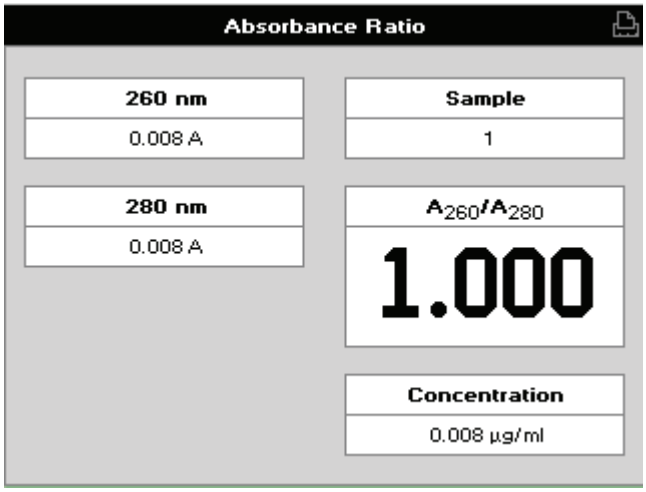
14. Enter the **Factor** using the keypad numbers, then press the down arrow.
    The available range is from 0.001 to 9999.

15. Press **OK** to start measurements.
    The Absorbance Ratio results screen is displayed.



16. Insert the reference sample, then press 0A 100%T.
    This reference measurement will be used for all subsequent samples until repeated.

17. Insert your first sample and press .
    The absorbance at the selected wavelengths is measured, corrected by the background wavelength value if this was selected and the ratio between Wavelength 1 and Wavelength 2 is calculated.



18. Repeat Step 17 for each sample.

➢ Press to display the available method options, which you can select using the keypad numbers:

1	Method Settings	Returns to the Method Settings screen.
2	Print	Prints via selected method.
3	Show Graph	Toggles the graph on and off. The graph shows a spectrum across the range of the measured wavelengths, which are marked by cursors.
7	Sample Number	Adds a prefix to the sample number and resets the incrementing number to the desired value.
8	Save Method	Use the left and right arrows to select a folder to store the method in (Favorites/Methods 1–9), then press the down arrow and enter a name for the method. Press **Save** to save the method.
9	Auto-Print	Toggles Auto-Print on and off.

➢ Press or , or wait 20 seconds to exit the method options.

➢ Press to return to the Standard Methods folder after all your samples have been measured.

Accessories

Accessories and Consumables

Supplies, accessories, and replacement parts can be ordered directly from PerkinElmer. See the PerkinElmer website at http://www.perkinelmer.com for more information.

Part Number	Accessory/Consumable
L7110230	Lambda Bio/XLS Printer Module
L7110231	Lambda Bio/XLS Print Utility and Cable
L7110232	Lambda Bio/XLS Spare Printer Paper (20 Rolls)
L7110233	Lambda Bio/XLS Bluetooth Accessory

A range of cells and microcells are also available from PerkinElmer that are suitable for use with the Lambda XLS/XLS+ instrument. Go to the PerkinElmer website and select UV/Vis Accessories & Consumables under UV/Vis in LAS Products and Services. Any of the 10 mm cells found there will be suitable for use with the Lambda XLS/XLS+ instrument.

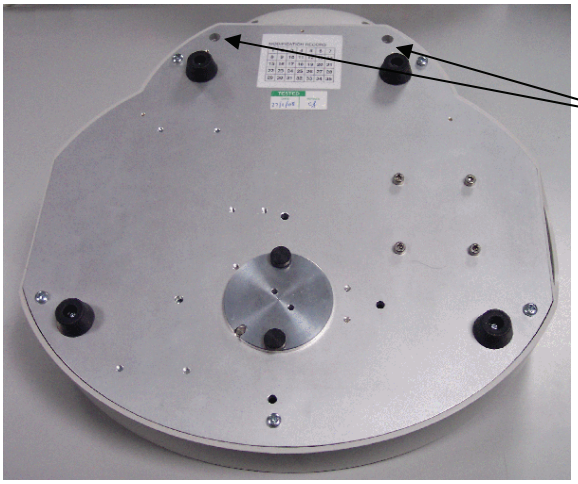
Printer Installation and Configuration

The Printer Accessory (L7110230) is an optional accessory that allows you to print your data as you run your samples, directly from your instrument.

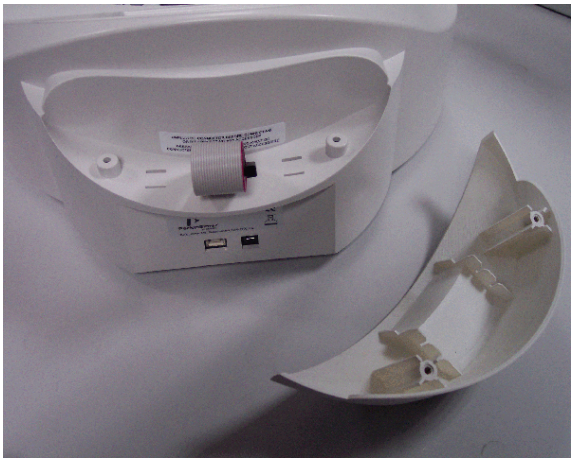
Printer installation

1. Turn off the line power supply and disconnect the power cable.

2. Turn the instrument over and remove the two cap head screws using the 3 mm hexagonal wrench provided.

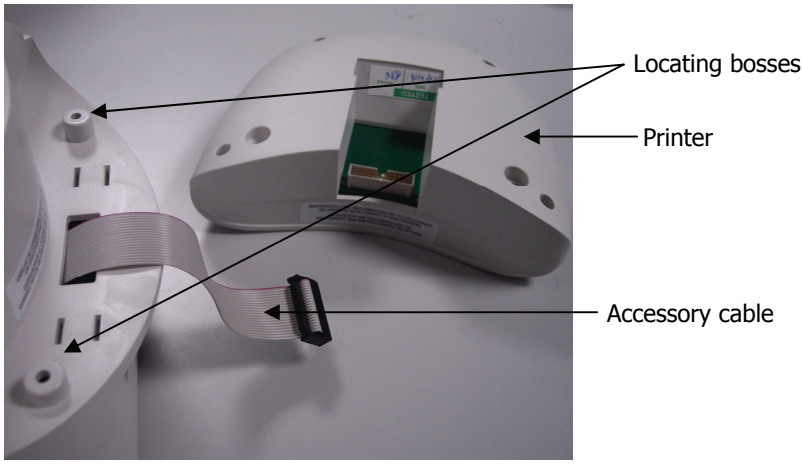


3. Turn the instrument back over and lift the accessory cover vertically upwards to remove. Remove the tie-wrap from the cable.



4. Invert the instrument and replace the cap head screws.

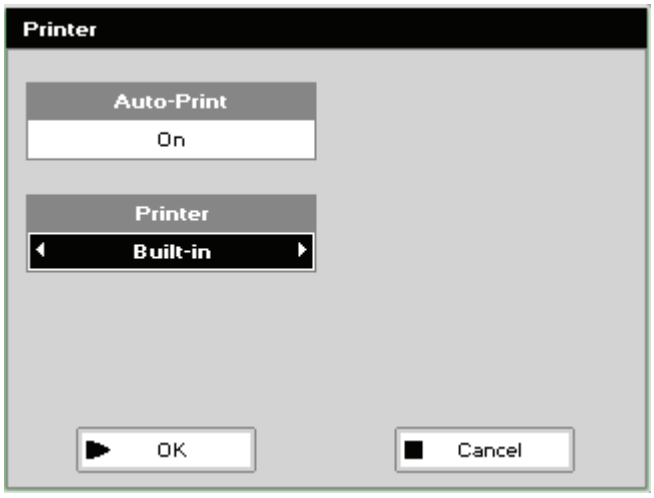
5. Plug the accessory cable into the printer.



6. Lower the printer onto the locating bosses and push down firmly.
7. Reconnect the power cable.

Printer configuration

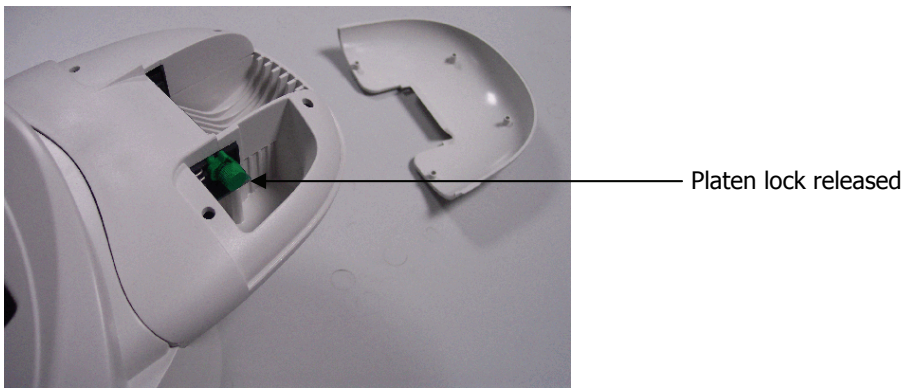
1. Switch the instrument on and then open the Utilities folder.
2. Press 3 to open the Printer folder.
3. Select **Built-in** as the **Printer** option using the arrow keys.



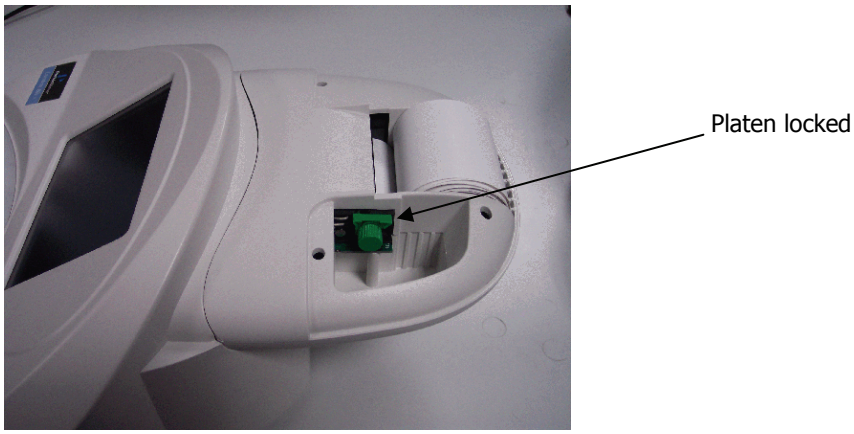
4. Press **OK** to save the settings.

Loading or changing the printer paper

1. Lift off the paper compartment cover.



2. Lock the platen and turn the knob to feed the paper.



3. Feed in the paper.
   Sometimes it helps if the platen lock is released.

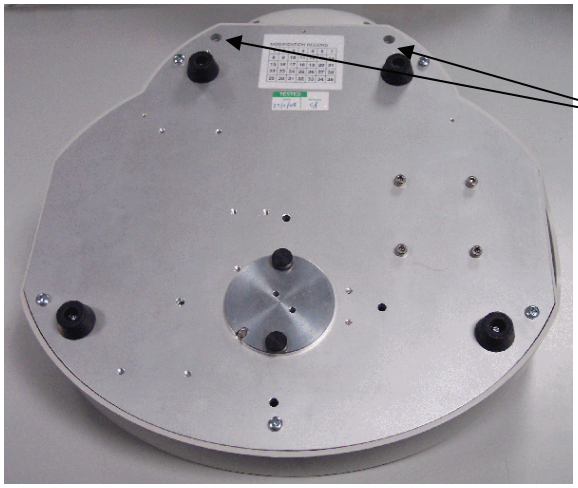
4. Replace the cover.

Bluetooth Accessory Installation

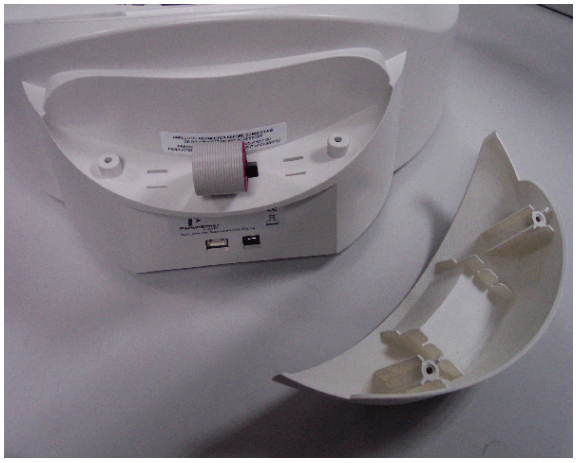
1. Remove the power cable from the instrument.

2. Turn the instrument over and remove the two cap head using the 3 mm hexagonal wrench provided.

3. Turn the instrument over and remove the two cap head screws using the 3 mm hexagonal wrench provided.

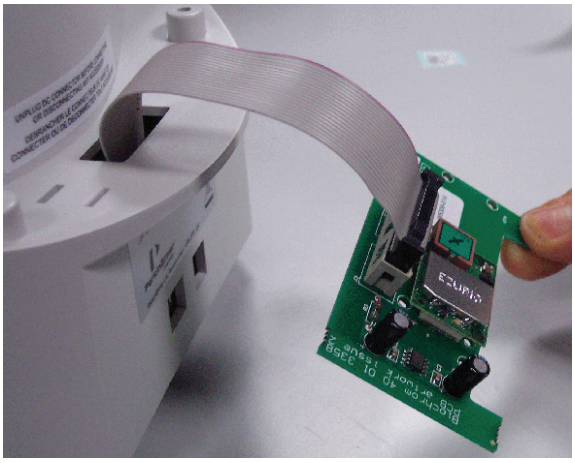


4. Turn the instrument back over and lift the accessory cover vertically upwards to remove it.



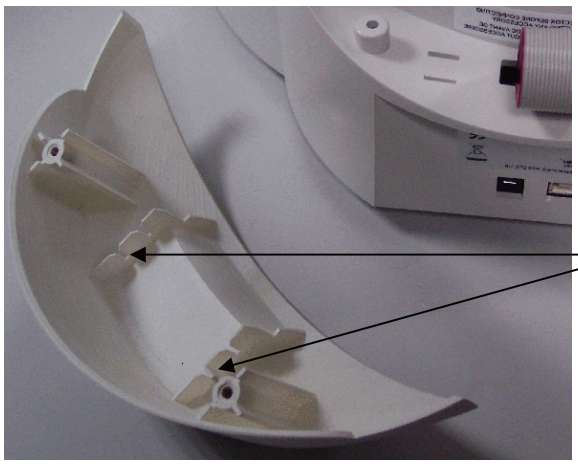
5. Remove the tie-wrap from the cable.

6. Plug the accessory cable into the Bluetooth module.



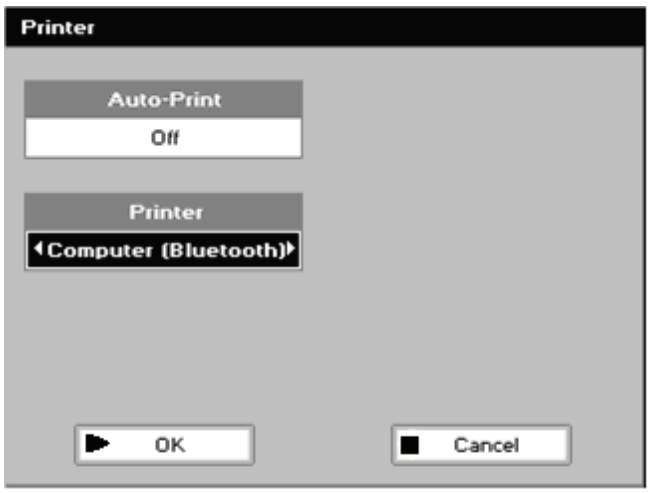
7. Plug the two lugs on the Bluetooth module into the innermost slots in the base of the case.

8. Lower the accessory cover vertically downwards onto the instrument, engaging the PCB in the innermost slots in the accessory cover.



9. Invert the instrument and replace the two cap head screws.
10. Connect the power cable.
11. Switch the instrument on and open the Utilities folder.

12. Press 3 to open the Printer folder.
13. Select **Computer (Bluetooth)** as the **Printer** option using the arrow keys.



14. Press **OK** to save the settings.

Lambda Bio/XLS Print Utility

There are two software applications comprising the Lambda Bio/XLS Print Utility.

The Lambda Bio XLS Report Utility is an application running separately under Windows XP that enables you to connect via a USB cable to a PC onto which the software has been installed. You can connect to several instruments simultaneously, limited only by hardware and the speed of the host system. Once your data is on the PC it can be printed directly to any printer that is connected to that PC or saved. The Report Utility can store data either to a common directory or be configured to save to independent directories by both file format and connection. It can save data as an Enhanced Metafile (.emf) graphics file, a comma delimited (.csv) data file, a tab delimited (.txt) data file or as an Excel file, or in print utility (.pvc) format for viewing using the Lambda Bio XLS Report Viewer.

NOTE: An internal printer is also available for the instrument. This is either supplied pre-installed in the instrument or as an optional accessory (L7110230).

If you have this option, please see the *Lambda Bio/XLS Print Utility User's Guide* (L6050015) on the *Lambda Bio/XLS User Manuals CD* (L6050018) for more information.

Maintenance

General Maintenance

WARNING

Unauthorized Adjustments and Servicing

Do not attempt to make adjustments, replacements or repairs to this instrument. There are no user-serviceable parts in this instrument. If you have any problems, access the Troubleshooting Guide on the PerkinElmer website and work through the process there:

http://www.perkinelmer.com

If you do not have access the Troubleshooting Guide, or have any further problems, contact Customer Care (see Appendix 2: Customer Care on page 85 for more information).

CAUTION

Before using any cleaning or decontamination methods except those specified here, users should check with Customer Care that the proposed method will not damage the equipment.

Cleaning the instrument

External Cleaning

Switch off the instrument and disconnect the power cord before cleaning your instrument.

Clean the outside of the instrument using a damp cloth. A mild liquid detergent may be used, if necessary. Always perform a patch test on an inconspicuous area of the instrument before you clean the entire instrument.

Clean all spilled materials from the affected area immediately and wipe it dry with lint-free paper or cloth.

Removing the cell holder for cleaning

The sample cell holder can be removed for cleaning:

1. Loosen the thumbscrews on the sample holder cover on the base of the instrument, by turning them anticlockwise.
   The thumbscrews remain attached to the plate.

2. Lower the sample holder out of the instrument.

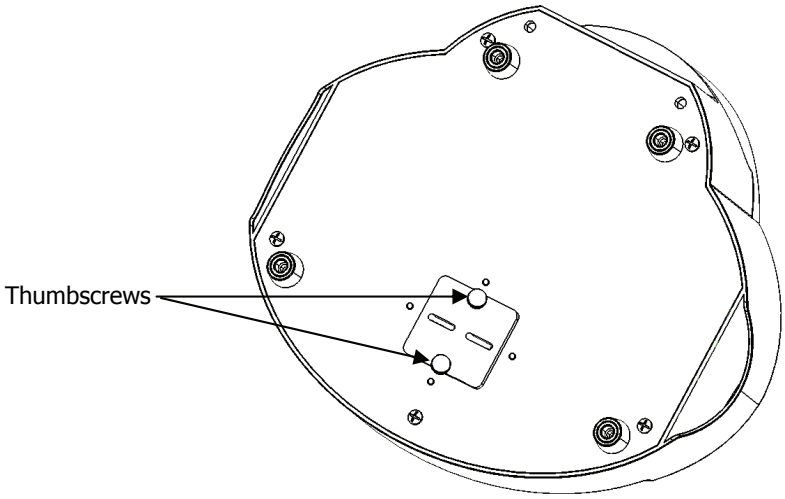


Figure 10 Position of cell holder thumbscrews

Storage and Shipping

This unit should be stored or shipped in its original packaging, which should be kept for this purpose. The unit should be kept in its packaging in a dry, non condensing environment free from dust or dirt, in the range −10 to 50 °C.

Should you need to return your instrument to PerkinElmer, a decontamination certificate is required before the instrument is shipped. Decontamination certificates can be obtained from PerkinElmer. The Troubleshooting Guide, which will help you work through the returns process, can be accessed at:

http://www.perkinelmer.com

If you do not have access to the Troubleshooting Guide, you can also contact Customer Care (see *Appendix 2: Customer Care* on page 85 for more information).

It is the responsibility of the user to carry out appropriate risk assessments and, if applicable, decontamination procedures before returning the instrument.

Appendices

Appendix 1: Specifications

Specifications are measured after the instrument has warmed up at a constant ambient temperature and are typical of a production unit. As part of our policy of continuous development, we reserve the right to alter specifications without notice.

Specification	Lambda XLS	Lambda XLS+
Wavelength range	190–1100 nm	
Wavelength scanning range	200–950 nm	
Monochromator	Flat grating	
Wavelength calibration	Automatic when the instrument is switched on	
Spectral bandwidth	5 nm	3 nm
Wavelength accuracy	±2 nm	
Wavelength reproducibility	±1 nm	
Light sources	Pulsed xenon lamp	
Detector	1024 element CCD array	
Absorbance range	−0.300 to 2.500 A (0 to 199%T)	
Photometric linearity	±0.005 A or 1% of the reading, whichever is the greater at 546 nm	
Photometric reproducibility	±0.003 A (0–0.5 A), ±0.007 A (0.5–1.0 A)	
Stray light	<0.5% at 220 nm and 340 nm using $NaNO_2$	
Zero stability	±0.01 A/hour after 20 minutes warm up at 340 nm	
Noise	0.005 peak-to-peak 0.002 rms	
Digital output	USB port standard, Bluetooth option	
Dimensions	340 × 310 × 170 mm (340 × 420 × 170 mm with printer attached)	
Weight	Approximately 4.5 kg	
Power input	100–250 V, 50/60 Hz, Max 30 VA	

Appendix 2: Customer Care Contacts

NOTE: If you experience any problems with your instrument, please see the Troubleshooting Guide at http://www.perkinelmer.com before contacting Customer Care.

Customer Care USA:	1 00 762 4000	(In the USA)
	(+1) 203 925 4602	(Outside USA)
Customer Care EU:	0800 40 858	(Belgium)
	0805 111 333	(France)
	0800 0 00 66 79	(Germany)
	0800 90 66 42	(Italy)
	800 099 164	(Spain)
	0800 896 046	(UK)
Customer Care Brazil:	11 38 68 6200	
Customer Care Canada:	800 561 4646	
Customer Care China:	10 5820 8166	
Customer Care India:	022 6760 1700	
Customer Care Japan:	45 339 5889	
Customer Care Singapore:	67799 539	

Index

A

Absorbance Ratio 65
Accessories 70
Add Peak 47

B

Bluetooth Installation 74

C

Cleaning the instrument 80
Concentration 49
Consumables 70
Contrast 34
Conventions
- keyboard text 7
- Notes, cautions and warnings 7
- on-screen text 7
- text 7

Customer Care 85

D

Display 20

F

Favorites 26

G

Graph Scale 48

I

Installation
- Connecting to the Power Supply 17
- Unpacking 16

Instrument Home Page 22
Instrument Overview 20

K

Keypad 20
Kinetics 60

L

Language 32

M

Maintenance 80
Methods 26
- Absorbance Ratio 65
- Concentration 49
- Kinetics 60
- Method folders 26
- Method Options 28
- Multi Wavelength 41
- Single Wavelength 38
- Spectrum 44
- Standard Curve 54

Multi Wavelength 41

O

Options 25

P

Peak Detection 46
Preferences 34
Printer
- Configuration 72
- Installation 71
- Loading Paper 73
- Printer Setup 33

R

Report Utility 77
Report Viewer 77

S

Safety
- General Safety 10
- Unpacking and Installation 13

Sample Handling 36
SD Memory Card 27
Shipping 82
Single Wavelength 38
Slope 63
Specifications 84
Spectrum 44
Standard Curve 54
Standard Methods
- Absorbance Ratio 65
- Concentration 49
- Kinetics 60
- Multi Wavelength 41
- Single Wavelength 38
- Spectrum 44
- Standard Curve 54

Startup and Shutdown 22
Storage 82

U

Using the Software 23
Utilities 31
Regional 32

Z

Zoom Mode 48